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The Journal of Ophthalmic Prosthetics has been created to provide a forum for the publication of original articles containing clinical and research information for professionals who serve patients that have suffered eye loss. The primary emphasis is on ocularistry, the science, art, and craft of making artificial eyes; additional areas of interest include articles from related professions involved in the goal of rehabilitating the anophthalmic patient, including ophthalmic plastic surgery, patient counseling, anaplastology, and optics. Articles may relate to either current or historical information concerning techniques, materials, and procedures that have a clinical application.

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I have enjoyed and learned from the papers presented in the *Journal of Ophthalmic Prosthetics* for many years. I am grateful to those who have submitted papers as well as to those who have been devoted to putting together this outstanding educational resource.

Education has never been more important in our professional lives, as well as in our everyday lives. As the world continues to become more complex, navigating through all that life has to offer and to accomplish all that is necessary requires more time just learning how to use all the technological offerings of the age.

Computers and technology, for example, are incredibly helpful in our day-to-day lives, as well as professionally. However, it takes time and knowledge to use all that technology has to offer. Increased knowledge allows us to do more and to better serve others. This essential professional knowledge is what our journal offers us in each edition.

I salute and commend Steve Sanders, Senior Editor of the *Journal of Ophthalmic Prosthetics*, and his committee, which consists of Steve Sanders! He has been a committee of one for several years now, and I am sure Steve could use some help from other members.

This issue of the Journal will be unique, in that all the papers will be by Canadian authors. I can’t wait to read it!

Doss K. Tannehill, B.C.O., B.A.D.O.
President, American Society of Ocularists
I t is my pleasure to present this special, all Canadian, issue of our *Journal of Ophthalmic Prosthetics* (JOP). Our peers, who practice in Canada, have been and continue to be some of the most active members of our special Society. Given their small numbers relative to the American Society of Ocularists members practicing in the United States, they as a group contribute an exceptionally high percentage of the volunteers, past presidents, presenters, board members, and writers that make our Society such an important part of our success. Perhaps a society name change is in order: *The Canadian Society of Ocularists and their Southern Friends!* Of course, I am kidding!

The “can do” and progressive spirit of the Canadian Ocularists is reflected in the articles that are presented in this issue. These articles present exceptionally clear and practical information that I personally find instructive and that I am sure will be useful to our membership.

I wish to thank to all the writers for their quick response to our request for their contributions and for the amazingly timely manner in which they sent in their initial drafts and corrections. This made our Editorial Board’s job much easier in assembling this publication. I do wish to acknowledge author Shirley Weyland, B.C.O., B.A.D.O, who in addition, took on the task of being the liaison between the Canadian ocularists/authors and me as Senior Editor.

My sincere hope is that all of our readers will enjoy and benefit from the work of these Canadian writers as presented here in this 2015 issue of the JOP.

Stephen Sanders, B.C.O., B.A.D.O., J.D.
Senior Editor, *Journal of Ophthalmic Prosthetics*
Announcements

► 2015 Annual Meeting, Friday, November 13 to Tuesday, November 17, Las Vegas, Nevada (In Conjunction with American Academy of Ophthalmology meeting)
► 2016 Mid-Year Meeting, April 21, 2016 to April 28, 2016, Loews Don CeSar, St. Pete Beach, Florida
► 2016 Annual Meeting, Chicago, Illinois (In conjunction with the American Academy of Ophthalmology meeting)
► 2017 Mid-Year Meeting, Hyatt Regency Hill Country, San Antonio, Texas
► 2017 Annual Meeting, New Orleans, Louisiana (In conjunction with the American Academy of Ophthalmology meeting)
► 2018 Annual Meeting, Chicago, Illinois (In conjunction with the American Academy of Ophthalmology meeting)
► 2019 Annual Meeting, San Francisco, California (In conjunction with the American Academy of Ophthalmology meeting)

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               Kevin R. Schou, B.C.O., B.A.D.O.
               Craig R. Patak, B.C.O., B.A.D.O.
               Todd A. Cranmore, B.C.O., B.A.D.O.
Tear Abnormalities Associated with Anophthalmos and Ocular Prosthetic Wear

ABSTRACT: Many ocular prosthetic wearers complain of discharge from the anophthalmic socket. This discharge usually presents as a thicker mucoid fluid that can be unsightly and annoying to the patient. Inflammation of the conjunctiva associated with chronic discharge can be potentially damaging to the socket. This article discusses how an ocularist can assess the condition of the socket, as well as the causes and effects of discharge and possible treatments that can be employed.

INTRODUCTION

A chief complaint heard from patients with an anophthalmic socket is the presence of chronic discharge. This discharge generally presents as a thick mucoid film that can be a nuisance relative to hygiene and appearance. Generally there is inflammation present with the discharge. This article describes the components of the tear film and how they are affected by biochemical, environmental, lifestyle, and anatomical conditions. The article also addresses what can be done to alleviate the issues.

DEFINITION OF THE PROBLEM

The tear film in the anophthalmic socket is deficient in the aqueous layer due to the loss of flow as a result of an enucleation. A study by Lee Allen et al showed significantly lower tears present in the enucleated socket compared to the companion eye.1 Additionally an investigation into tear measurement using Fourier-domain optical coherence tomography also concluded that tear meniscus parameters were reduced in anopthalmic sockets.2

A further study by Jang SY et al also looked at meibomian gland dysfunction (MGD) relative to tear film performance in prosthetic eye wearers and concluded that significant signs of MGD were present.3

The effect of reduced tear function in the anopthalmic socket leads one to conclude that a chronic condition of hyperosmolarity exists and requires assessment and treatment to maintain a healthy socket, thus reducing discharge and discomfort.

ASSESSMENT OF THE SOCKET

In order to establish a treatment plan for the patient an assessment of the socket should be performed. This involves a visual examination of the socket...
and lid area, a discussion with the patient regarding frequency of discharge, and a review of the wear and care history. The assessment should also include questions regarding environment, lifestyle, and nutritional values. A determination should be made as to whether there is an aqueous deficiency and/or lipid deficiency or allergies.

TEAR FILM COMPOSITION

There are three components to the tear film:

- The mucous layer produced by the goblet cells is the inner layer and renders the ocular surface wettable.
- The aqueous layer produced by the main lacrimal gland and the accessory glands.
- The lipid layer produced by the meibomian glands is the outermost layer and helps to distribute the tear film and prevent evaporation.

HYPEROSMOLARITY OF THE TEAR FILM

Osmolarity of the tear film is expressed as mOsm/L and typical normal readings would be in the range of 275 mOsm/L to 295 mOsm/L. Hyperosmolarity would be from 300 mOsm/L (mild) to 340 mOsm/L (severe).

Normal osmolarity would have the three components of the tear film in proper balance. Hyperosmolarity is a term used to describe a deficiency in the tear film that can be caused by aqueous or lipid deficiencies.

There are various instruments available to measure osmolarity, such as those produced by TearLab™ (San Diego, CA, USA). An article by Lin H et al describes the current diagnostic approaches and treatments. While their article is related to dry eye disease it provides relevant information that can be associated with anophthalmic sockets.

ENVIRONMENTAL AND BIOCHEMICAL FACTORS

Some of the factors that aid in creating a mucoid discharge include: evaporation; air-borne contaminants such as dust, pollen, and pollution; foods and beverages that have a diuretic effect; medications such as vasodilators; and mechanical irritation caused by wiping the lids often. These factors can lead to hyperosmolarity due to the evaporation and mechanical break-up of the tear film.

DYSFUNCTION

The anophthalmic socket can be described in two forms, those with lagophthalmos and those with complete lid closure. In the case of lagophthalmos, the tear film is not picked up from the tear lake in the lower lid margin and presents a loss of basal tear distribution.

A person who has undergone an enucleation is predisposed to hyperosmolarity of the enucleated socket due to loss of aqueous tear flow from the globe. This leads to a chronic thicker mucoid discharge and sometimes a chronic inflammation of the mucous membranes. Other conditions that can arise are blepharitis, contact dermatitis, and stretching of lids and surrounding skin due to constant wiping.

Another factor contributing to the condition of hyperosmolarity of the tear film includes the levels of protein build-up on the prosthetic eye, the patient’s frequency of polishing, and the quality of the polished surfaced. A smooth finish on the surface of the prosthetic eye will allow for better tear film distribution and less evaporation.

If the lipid layer is not operating properly, there may some meibomian gland dysfunction. The lack of normal lipid volumes contributes to the breakup of the tear film promoting a greater degree of aqueous evaporation.

EFFECTS OF CHRONIC HYPEROSMOLARITY

Due to an inadequate supply of aqueous component the tear film is unstable. This instability can lead to morphological changes in the conjunctiva. Desiccated cells of the mucin layer are damaged and lead to a destabilization of the tear film. The conjunctiva can also be further compromised by conjunctival scarring resulting in a loss of goblet cells.

As a result of this instability, the pro-inflammatory cytokine expression is increased leading to inflammation of the conjunctiva surface. This inflammation causes structural damage of the mucin cells of the conjunctival surface due to desiccation of the mucin layer and drying off of cells.

The overall effect to the patient is a chronic thick mucoid discharge, chronic socket inflammation, and
increased risk of blepharitis. Constant patient management of the discharge can lead to skin surface conditions due to contact dermatitis and other allergic reactions to materials used to wipe and clean the area.

PROSTHETIC SURFACE AND INFLAMMATION

As a result of a chronic dehydration to the socket, cytokines expression increases leading to an inflammation of the conjunctiva. Some studies have looked at the surface of the prosthesis as the cause of inflammation without considering the tear film dysfunction.8

Pine et al describe increased inflammation in the anophthalmic socket, however their study was simply looking at this in relation to surface deposits and they concluded that surface deposits are not linked with inflammation.9

Pine et al, in another article, also investigated the presence of mucoid discharge in prosthetic eye wearers relative to cleaning regimes and stated that “professional polishing regimes had little impact on discharge experience.” 10

In their conclusion they did recognize that further research is required to better understand the relationship between the prosthetic eye and socket including a better understanding of the socket fluids.

RESTORING NORMAL OSMOLARITY

There are various treatment options available to the prosthetic eye wearer depending on their level of socket condition. An article by Moshirfar et al compares the various brands of tears and their efficacies related to dysfunctional tear syndrome (DTS).11 In the article the authors describe a treatment flowchart divided into mild, moderate, and severe DTS. Most of this office’s patients fall into the moderate category and can benefit simply by using Systane Ultra™. However those with severe symptoms which also include patients with lagophthalmos, will benefit from gels or ointments or liposomal replacement products such as sprays or liposomal based artificial tears.

Inflammation can also be treated. In cases of less severe but still chronic inflammation a mast cell stabilizer such as sodium chromolate may be used. In cases of more severe inflammation a topical steroid such as Maxidex™ may be recommended prior to using the artificial tear regimen to stabilize the socket.

It is also necessary to clean and polish the prosthesis at regular intervals. It has long been understood that cleaning and polishing the surface of the prosthesis results in greater comfort for the wearer. In this practice’s experience patients who have their prosthesis cleaned and polished bi-annually have greater comfort and a healthier socket. The reason for this is that a smoother surface increases wettability by slowing the evaporation rate of the tear film due to less surface area for evaporation to occur. 12, 13

There are a variety of commercially available drops to assist in restoring normal tear osmolarity. These range from low viscosity drops such as Systane Ultra™, to medium viscosity gels such as Tear Gel™. For nighttime application there are various ointments such as Lacrilube™ or HypoTears™.

If the lipid layer is deficient there are lipid based drops to aid in restoring the balance of lipids in the tear film.

To combat blepharitis, an eyelid cleanser can be employed routinely.

Great success has been observed in working with patients to restore normal osmolarity and thus long term comfort by designing a treatment plan with patients using various modalities of care based on their degree of inflammation. This includes assessing the factors which contribute to the patient’s problem and helping them understand how to experiment with their routine until they find a satisfactory level of comfort.

SUMMARY

Anophthalmic patients are prone to suffer a chronic inflammation of the socket associated with discharge, blepharitis, and a burning and/or itching sensation producing a general discomfort. Cleaning and polishing the prosthesis at regular intervals is important to reduce the build-up of protein deposits and allows the surface of the prosthesis to remain wettable helping to deter evaporation of the tear film for increased comfort. Due to the loss of aqueous flow from the ciliary body, the socket remains in a desiccated state promoting inflammation, which then leads to chronic mucoid discharge, and blepharitis. To restore the balance of the tear film a method to apply necessary hydrating
drops needs to be established for each patient, modifying it as necessary by taking into account the external and biophysical factors affecting the stability of the tear film.

REFERENCES


CORRESPONDENCE TO:

Jonathan S. Brett, B.C.O, B.A.D.O.
Brett Ocular Prosthetics Inc.
339 Wellington Rd. S., Suite 125
London, Ontario N0J 1N0
Canada
Prosthetic Fabrication in Identical Triplets with Bilateral Retinoblastoma and a Single Enucleated Globe Using a Myoconjuntival Enucleation Procedure

ABSTRACT: Retinoblastoma is a malignant tumor of developing retina cells due to a genetic mutation occurring in 1 out of 17,000 live births with a global annual diagnosis rate of approximately 8,000 patients. Giving birth to maternal monozygotic triplets is even more rare, occurring in 1 in 62,500 pregnancies. The chance of identical triplets with retinoblastoma could be considered almost statistically impossible. This paper follows the diagnosis, cancer treatment, the myoconjuntival enucleation procedure and prosthetic fabrication and care of identical triplet boys with bilateral retinoblastoma.

INTRODUCTION

As ocularists we are trained to copy and recreate something unique. An impression of the eye socket is taken in order to fit the unique shape, size, and dynamics of that cavity. The prosthesis is sculpted and painted to match the iris pattern and color of the companion eye, just as the scleral tinting is copied to mimic that same unique companion eye. When combining these elements the ocularist creates a prosthesis that can effectively copy the appearance so that it is almost indistinguishable from the live eye. When dealing with genetically identical siblings there is an opportunity to see the uniqueness of the individual from a prosthetic perspective that is not achievable in other cases. This study follows the case of identical triplets, diagnosed with bi-lateral retinoblastoma and unilaterally enucleated at different times before the age of one.

PATIENT GROUP

The surgery technique used was the myoconjuntival enucleation procedure. All three patients had the same surgeon and the procedure was performed at the same hospital (Table 1).
been using this technique since 2011. The procedure creates well-balanced socket shape and prosthetic stability. Fornix depth and rectus muscle placement allow for excellent motility. In 4 years and 35 enucleation procedures (children aged 3 months to 36 months), the hospital has seen zero implant exposures when using this procedure. From the ocular prosthetic perspective there has been excellent rotational stability, and zero cases of ptosis complications or perceivable superior sulcus deficit. This procedure has also been used in secondary implant procedures following implant exposure or extrusion with excellent postoperative results.

This technique utilizes PMMA material with a proven record of use for over 60 years in the field of ocular implants with no known material complications for patients. The motility is comparable or better than porous implants without the potential complications associated with fully integrated implants.

### MYOCONJUNCTIVAL ENucleATION PROCEDURE

The myoconjuntival enucleation technique consists of the implantation of a 20mm PMMA solid sphere, posterior to Tenon’s capsule (Figure 1). The rectus muscles are sutured to their respective fornices rather than imbricated anterior to the wrapped (often porous) ocular implant in the standard enucleation procedure. In contrast to the standard technique, the myoconjunctival technique achieves the following:

- Creates better prosthetic motility shown in controlled study by Shome, *et al* 
- Negated implant migration as rectus muscles do not create tension on the implant
- Reaches into deep fornices due to a larger implant size, even at a young age.

The surgeon that performed these procedures has

<table>
<thead>
<tr>
<th>TABLE 1 Patient history and treatment.</th>
<th>CHILD 1</th>
<th>CHILD 2</th>
<th>CHILD 3</th>
</tr>
</thead>
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<td><strong>Anatomic position</strong></td>
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<td>O.S.</td>
<td>O.D.</td>
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<tr>
<td>Age of Diagnosis (months)</td>
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<td>3</td>
<td>4</td>
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<tr>
<td>Laser Therapy (# of treatments)</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Cryotherapy (# of treatments)</td>
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<td>4</td>
</tr>
<tr>
<td>Periocular Topotecan (# of treatments)</td>
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<tr>
<td>Intravitreal chemotherapy</td>
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<tr>
<td>Age of Enucleation (Months)</td>
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<td>n/a</td>
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<tr>
<td>Post-Enucleation Complications</td>
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<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Vision</td>
<td>n/a</td>
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</tr>
<tr>
<td>Follow-up</td>
<td>Ocular</td>
<td>20/20</td>
<td>Ocular</td>
</tr>
<tr>
<td>Age 1.5 yrs</td>
<td>Prosthesis</td>
<td>Prosthesis</td>
<td>Prosthesis</td>
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Figure 1 Technique of myoconjunctival enucleation with polymethyl methacrylate (PMMA) implant. A, Each rectus muscle was hooked, isolated, and tagged with a 4-0 silk suture just distal to the muscle insertion (arrowhead). A 6-0 Vicryl suture (Ethicon, Aurangabad, India) was passed through the belly of the muscle approximately 5 to 6 mm distal to the muscle insertion (arrow), and the muscle was transected in between the 2 sutures. After all the muscles were transacted, the optic nerve was cut and the enucleation was completed. B, The posterior Tenon’s capsule was identified (arrow). C, The PMMA implant was placed into the intraconal space posterior to the posterior Tenon’s capsule (arrow). D, The posterior Tenon’s capsule was closed with interrupted 6-0 Vicryl sutures (arrow). E, Each rectus muscle was sutured just short of the respective fornix using preplaced 6-0 Vicryl sutures. The sutures passed through the anterior Tenon’s capsule–conjunctiva complex and were exteriorized over the conjunctiva (arrow). F, The anterior Tenon’s capsule was closed with interrupted 6-0 Vicryl sutures (arrow). G, The conjunctiva was closed with continuous 6-0 Vicryl sutures (arrow). H, The exteriorized muscle sutures were tied on the conjunctival surface and the suture knot was left exposed. The figure shows exteriorized suture knots of the superior rectus and inferior rectus (arrows); and the lateral rectus suture end is being cut (arrowhead).4

Journal of Ophthalmic Prosthetics
INDIVIDUAL SOCKET DYNAMICS

The orbital socket and shape of the prosthesis is unique to each sibling. This shows the deviation from identical anatomy after enucleation, at different periods of growth. Age at enucleation is a determining factor regarding socket dynamics. Post-enucleation complications, such as lid abnormalities, symblepharon, recurrent growing masses, or implant migration has an impact too. Child 2 had a secondary benign mass removed inferior to the ocular implant; which created more orbital volume compared with the other siblings. The myoconjuntival technique utilization allowed for 18mm implants for all of the children even at such a young age. Figure 2 depicting the patients prosthesis, also clarifies the different shape of each socket.

Child 1 has been wearing his prosthesis the longest. It is slightly narrower than the other two, which could be a result of the early enucleation, but it has gotten wider in the past several months and is on track to catch up (Figure 2).

Child 2 has the largest prosthesis. It is to be expected as he had the secondary mass removed. His orbital volume is larger inferiorly but the shape displays good balance in all quadrants(Figure 2).

Child 3 is only 6 months post-op at the time of writing. His socket presents with excellent balance and motility. It is expected that the prosthesis will need enlargement in the coming months as residual swelling is re-absorbed(Figure 2).

CUSTOM IMPRESSION PROCESS

The process for custom fabrication with children of this age is a custom-made fitting tray and alginate impression taken under general anesthetic in the operating room. An ophthalmic impression material is used in conjunction with a custom tray, formed from dental base plate wax. The tray is formed to match the fornix curvatures and depth as well as the implant placement and curvature. Palpebral fissure size is matched to the companion socket. Care is taken to minimize soft tissue displacement during impression. Once complete, observed landmarks are analyzed and the process is repeated if the impression doesn’t match presented contours. Iris placement is also factored in at the time of impression and iris diameter is taken while under anesthetic. Impressions taken on myoconjuntival procedure patients must have sufficient width laterally to accommodate deep fornices and pronounced motility. The custom shape must also have thin peripheral edges and adequate inferior curvature for compatibility with fornix depth and implant motility. The anophthalmic sockets, without prosthesis, are shown in Figure 3.

IRIS REPLICATION

The human iris is unique to the studied variability of 1 in 10^72. A number when expressed along with an estimate of the total number of people who have ever lived on Earth, 10^11, suggests that no two people have
statistically ever had an identical iris pattern. With regards to genetically identical siblings there is a common misconception that these children are completely identical, including eye color. While there is a strong genetic correlation with color and iris appearance, the pattern details are as unique as unrelated eyes. Identical siblings can have for example blue eyes, but stroma size, pattern, and color details will differ. While matching identical siblings, care must be taken to match the individual’s iris.

The three identical siblings all had blue eyes with a whitish stroma blossoming out from the pupil. The extent of this flash is different for each child. The siblings were also diagnosed with a coloboma unrelated to their retinoblastoma and present as different size and intensity.

As seen in Figure 4, each patient has a surprisingly different iris color when studied up close. Child 1 has a deep blue color with a medium sized white stoma. The coloboma is narrow and grayish in color. The blue is a deep mauve blue. Child 2 presents with a very intense whitish yellow stroma that extends further out compared to the others. There is a pronounced ring before the limbus. His color has more yellow and chestnut tones than either of his siblings. His coloboma is the widest and most pronounced of the three. Child 3 has an extended stroma without the intensity of Child 2. His color has more yellow and chestnut tones than Child 1, but retains the darker blue edge. The iris color changes might be related to the treatments given to the other eye. Laser therapy and cryotherapy can have a direct affect on iris color based on the number of treatments and the age of the patient.

The iris was matched to the individual patient. Child 1, was 4 months old when the prosthesis was fabricated. Child 2, was 6 months old, and Child 3 was one year old.

As you can see from the images in figure 4, the iris color and pattern is very similar but not identical. Child 1 and 3 have the closest appearance while Child 2 differentiates with a lighter and more uniform white pattern and a more uniform outer ring. The colo-
The myoconjunctival enucleation procedure is an excellent technique for infant and child enucleation. Better early motility and better overall motility have been studied and observed. With the rectus muscles attached to their respective fornices, larger implants are possible in infants, minimizing the chances of implant migration and prosthesis loss.

Watching the children grow and mature is a special privilege clinical caregivers enjoy. When dealing with three identical brothers, I can only imagine what the future will hold.
REFERENCES


CORRESPONDENCE TO:
Matthew Milne, B.C.O., B.A.D.O.
Archibald Maxillofacial Prosthetics Inc.
700 Bay Street, Suite 401
Toronto, M5G 1Z6
Canada
Matthew.Milne@artificialeyecare.com
Maya’s Special Eye: Encouraging Ocularists Working with Children and their Families

ABSTRACT: Children born with anophthalmia or microphthalmia have no idea that anything is even different; for the parents, they are faced with a world of uncertainty and fear. Families require assurance, guidance and direction in how to support their child in the healthiest way possible.

This article will walk through a journey with one child and her parents, while encouraging ocularists to provide reassurance and confidence to families faced with a frightening and uncertain time. This article will provide ideas for working with patients and their families based on twenty-four years of experience as an ocularist working with young children and their families.

INTRODUCTION

Expectant parents look forward to their new born child arriving fully developed and healthy. For some parents however there is heartbreaking news; their baby is blind in one or possibly both eyes. Now they are faced with a world of uncertainty, fear and the feeling of being alone. As a father I’ve come to realize that there are many people in our child’s life that can have a positive effect on their development; as an ocularist I have had the pleasure of being an important part of the lives of many special children faced with the challenges of being visually impaired.

Once a child is diagnosed with microphthalmia or anophthalmia, the parents or guardians can experience a wide range of emotions. Faced with fear of the unknown future of their child, they have no idea what to expect. Some parents embrace the challenge of being a parent of a singular vision or possibly blind child with all the vigor of any new parent. However, some are not so fortunate. Some parents suffer with fear, guilt, blame, or doubt; they withdraw and are unable to imagine life for their child with a visual impairment. Some parents have so much anxiety that the child becomes overly protected and is treated with such care they themselves are unable to grasp the optimal opportunity that is available to each one of these special children.

INTRODUCTION TO MAYA

In the fall of 2012 a pediatric ophthalmologist at British Columbia Children’s Hospital in Vancouver, British Columbia, referred an infant girl born
with severe microphthalmia to the left eye. At just three weeks of age “Maya” came in to my office with her parents, “Paula” and “Curtis.” Maya’s parents put on a brave face but indeed had no idea of the journey they were about to embark. Paula was willing to share her perspective for the benefit of this article:

Maya was born on August 16, 2012. We felt so totally blessed, after trying for two years to get pregnant we were unsure this day would ever come. The doctor looked her over and mentioned to us that he was concerned about her left eye as it hadn’t opened. I thought there must have been some swelling from her delivery and hoped that it would be fine. The next day her eye still had not opened and they sent a pediatrician to see us. The pediatrician was unsure of what it could be so he booked us an appointment at British Columbia Children’s Hospital. It was hard to wait the week, not knowing what could be wrong. Praying that her eye would just open but it never did. Maya had an ultrasound of her eyes at Children’s Hospital at eight days old. As soon as I saw the picture on the ultrasound screen, I knew something was very wrong. We were then told by the pediatric ophthalmologist that Maya had been born with severe complex microphthalmia. We had never heard of microphthalmia before and had no idea that the eye could just not develop. It was already kind of scary having a new baby, and now we were faced with something that we had never heard of before.

CONSULTATION WITH THE OCULARIST

Maya was three weeks old when she came into our office for her initial consultation. The visit began with introductions and by simply showing Paula and Curtis some pictures of the other children our office has made ocular prostheses for. It is important for parents to start their journey with hope and vision of a positive future for their child. Generally, when parents bring their child in for a conformer or artificial eye they are living in that moment of that day while holding on to tremendous fear of what the future may hold. What they don’t expect from seeing the ocularist is something they need; support, direction, and a life-long relationship that can provide stability, confidence, and expertise. It is important to not only develop an initial treatment plan for the child, but to build a trust and a relationship with both the parents and the child to create the most successful outcome for them all.¹

It is during the consultation that ocularists can get a feel for the disposition of the parents and how they are responding to their personal situation. Not all parents come in ready to tackle what needs to be done, but with suggestions and encouragement the ocularist can help promote a positive perspective to a situation that to the parents, may not seem so positive at the beginning.

By the end of the consultation appointment, Maya’s parents felt encouraged and hopeful. They were enthusiastic and willing to help in any way. They were encouraged that whenever possible, both parents, be present for visits to the office. When both parents can participate equally, there is a better chance of the partners being able to support each other through the process of raising a visually impaired child. Parents united will provide the child with confidence and comfort. As the stress of having a child with microphthalmia or anophthalmia can naturally be hard on the relationship of the parents; experiencing the visits to their ocularist together can relieve the stress of only one parent undergoing the appointment alone. This is most important in the beginning but as time goes on both parents attending can be positive, but it may be less necessary. Ocularists are encouraged to teach each parent about removing, cleaning, and inserting the prosthesis. Again, it is beneficial for both parents to see how this is done. Having each parent participate in the office, using a two-person system to work with the child, will build confidence in the parents and will lessen the chances of any surprises at home. The child will feel at ease and the event will be less traumatizing for all involved.

THE TREATMENT PLAN

Creating a treatment plan for the child is imperative.² Sharing the potential outcome with the parents will create positive yet realistic expectations. Parents want to hear options for certain procedures such as taking an impression. When possible, the ocularist should encourage involving the parents by allowing them to be partially active in the decision making process. One example is the decision whether to take an impression in
the office or to schedule an “Evaluation Under Anesthesia” in Children’s Hospital. Their participation can provide the parents with the feeling of being active in the process. It will give them the opportunity to have some input in their difficult and sensitive situation. The key here is to promote confidence in the parents by being a part of their child’s journey.

The ocularist must be forthright and honest about what both scenarios look like. For example, by explaining to Paula and Curtis that if an attempt was made to take an impression in the office, the child would need to be held securely and would likely resist and cry. When the parents are prepared for the child’s reactions it creates confidence and awareness in what to expect. There are no surprises and with that the parents remain calm and the child feels safe and secure.3

The ocularist needs to be completely honest with the parents with about what needs to be done dur-
This enabled Paula to clean the prosthesis, spin it back into place when it turned, and put it back in the socket if it dislodged while at home. While Maya’s treatment plan included increasing her expansion conformer size every four to six weeks, Paula and Curtis did not have to bring Maya into the office every time her conformer or prosthesis dislodged or turned.

This has been a very big learning process for us. I was very afraid at the thought of taking the conformer in and out at first, but it’s not as bad as I thought and I’m quite comfortable with it now.

Ocularists will find that the children whose parents are comfortable working with the prosthesis are less likely to fuss and are usually calmer during their visits to my office.

PARENT PARTICIPATION

Engaging parents early encourages active participation with the mechanical part of their child’s conformer or prosthetic eye. After her initial fear, Paula was eager to try to remove Maya’s conformer in the office. This gave her the assurance to learn to work with the prosthesis so when she was home, she felt more confident.

SUPPORT AND THERAPY

As a result of this practice building a supportive relationship with the parents of my young patients, many of them have offered their support to new families facing this unexpected journey. Ocularists can maintain
a small list of names of patients who are willing to be contacted by new parents for support and reassurance. When Maya was first diagnosed with microphthalmia, Paula and Curtis were able to reach out to another one of my young patient’s family who were faced with the same situation. This was of enormous value to Paula and Curtis and now, in turn, Paula is currently available and eager to be contacted by other families of anophthalmic and microphthalmic children. She is enthusiastic to provide encouraging support and looks forward to helping others.

You will find that some parents struggle more than others with accepting the fact that their child is visually impaired. Dealing with the excitement of a new child coupled with the grief and loss over their child’s vision can be devastating and confusing. Not all families will be willing to reach out to strangers for support and may need professional help. Ask the parents how they are coping; suggest that their family doctor can provide them with options around seeking support through a professional counsellor. Normalize reaching out for support by sharing that many parents have benefitted from seeing a counsellor or using other available resources.\(^5\)

Support is available in many forms. Facebook\(^\text{TM}\) has a family support group named “MAPS MOMS” which is the acronym for “Microphthalmia, Anophthalmia Parent Support”. “MAPS MOMS” is a closed group on Facebook\(^\text{TM}\) where parents of children with microphthalmia and anophthalmia can openly discuss their struggles and successes with their personal journey. It is here the family can reduce the feelings of being alone and overwhelmed with facing new and sometimes unexpected challenges. There are currently just over one thousand members from all around the world who share pictures, experience and support on “MAPS MOMS.” Ocularists should share this with their young patient’s parents and encourage them to check it out. Please note this is not a site for professionals. It is designed for the families of visually impaired children only.

**AVAILABLE RESOURCES**

As Maya’s parents were overwhelmed with having to face this uncertainty, they were encouraged to be active in questioning and research. North America has numerous opportunities and resources for the visually impaired and their families. It is important to encourage the parents of your young patients to participate in these resources for optimum support and inspiration. Ocularists are encouraged to have a variety of local resources on hand for the new families and to encourage them to research and discover the type of support that works best for them.

**SURPRISE VISIT**

In the spring of 2013, Maya and Paula came by the office to present a wonderful gift. To my surprise she had made a simple, but beautiful, picture book

![Figure 3](image-url) Maya reviewing herself in her own picture book with her mother Paula.
entitled Maya’s Special Eye. The seventeen-page, hard-cover book covers the first eighteen months of Maya’s journey. During Maya’s visits Paula took pictures of the process of making expansion conformers and her prostheses. She charted their journey starting at Maya’s first visit, written from the perspective of a mother. Paula’s initial goal was to have something to share with Maya about her own experience prior to coming to see the ocularist.

Now that Maya is a little older, looking at her book before and during her appointments seems to help reduce any anxiety she may have about coming to her appointments. This in turn makes it a lot easier for Paula, Curtis, and me.

I was so impressed with Maya’s Special Eye, that I asked Paula if I could share the book with my other patients. Paula encouraged this and she was thrilled the book could be used to help other families. Paula agreed to let me purchase a few copies of Maya’s Special Eye so I could share it with the local pediatric ophthalmologists. After giving a copy of Maya’s Special Eye to Maya’s ophthalmologist, British Columbia Children’s Hospital contacted Paula to discuss using the book for a source of information for hospital patients and their families. Paula agreed and she is currently working to produce patient-friendly educational literature for the hospital. This little book and Maya’s story has encouraged and helped many families, of all ages, in my office.

2014 ASO CONFERENCE

At the 2014 American Society of Ocularists Spring Conference in Savannah, Georgia, I shared Maya’s Special Eye with a few of my fellow ocularists. I received positive feedback and many of them mentioned that they were interested in having a copy for their office. Maya’s Special Eye has now been published as an “E-Book” and is available for download at no cost (link: http://store-au.blurb.com/ebooks/511696-maya-s-special-eye).

RESULTS

With our society placing so much emphasis around appearing “normal,” parents in many cases will have expectations of their child appearing as if there is nothing different about them. As the children grow from preschool to college, the goal is to eliminate any possible discouragement or disadvantage for them as they enter into a highly competitive society.

As we aim for positive results, we need to set realistic expectations with the parents. Although in most cases we can achieve life-like replications and wonderful results, working with children can be eventful. It is important to gently prepare the parents to expect the unexpected and encourage them to keep an open mind about the results they may be presented with. In Maya’s case we achieved amazing results but only with time, perseverance, and patience.

FUTURE

As Maya grows, Paula and Curtis encourage her to be as active as if she had full vision. Many parents will “bubble wrap” their child and not allow them to do the things full sighted children do. This can impair the child’s development and can create fear of things they are very capable of doing. We as ocularists can encourage the parents with stories of our active patients
to allow their child to try new things so they can grow into independent and healthy little people.

CONCLUSION

Now that I have been an ocularist for twenty four years, I find it very rewarding as I become a part of the lives of these special children and their families. Many of the children who have been coming to me since they were young continue to return to my office as adults, some with families of their own. I see moms helping moms, children teaming up at camps and forming life-long friendships, and even patients helping other patients as they meet in the waiting room. Encouragement and a positive experience can make the world of difference for the family and the little one.

Maya is very happy with her Special Eye!

ACKNOWLEDGEMENTS

I would like to acknowledge Maya’s parents, Paula and Curtis, for their support and contribution to the writing of this article. Thank you guys for being awesome parents to Maya. All the efforts and energy you give to pay-it-forward to other families who are faced with the challenges of raising a visually impaired child is, and will continue to be, of great value to them and the community as a whole. I would like to send a very special thank-you to Maya for her bravery and cooperation at all her appointments. You will be an awesome big sister Maya. Lastly, I would like to thank my assistant, Lavene Noren, for helping me with pulling this all together.

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ADDRESS ALL CORRESPONDENCE TO:

Robert Drennan, B.C.O., B.A.D.O.
272-9600 Cameron Street Burnaby BC Canada V3J 7N3
E-Mail: robdrennaneyes@gmail.com
Fabrication and Function of the LaFuente Pressure Mask

ABSTRACT: Treatment of the contracted socket can be the difference between a patient’s ability and inability to retain an ocular prosthesis. In our experience the LaFuente pressure mask is a valuable tool for increasing stability when fighting the fluctuating cicatricial forces of socket contraction. In many cases, wearing the pressure mask for a short period of time can create a sufficient fornix for maintaining an ocular prosthesis. This article will outline the importance of the LaFuente pressure mask and provide instruction on the fabrication of this device.

FUNCTION OF THE LAFUENTE PRESSURE MASK

The LaFuente pressure mask is a beneficial tool in the management and control of the contracted socket and postoperative cicatricial complications. Where the commonly used pressure conformer and bandage fail the mask provides a constant, direct pressure where needed.1 A sufficient fornix can often be created in as little as 20 minutes to 60 minutes of wearing the mask.2 Whether used for preoperative or postoperative therapy, the mask is an effective resource that can be utilized by the ocularist. In dealing with patients with a level I to level V contracted socket, it is imperative that all parties have a mutual understanding regarding what is required with this type of care.3 Communication between the surgeon, ocularist and patient is imperative for success, and failure to recognize this relationship will usually end in a poor result or complete failure. Neither a textbook surgical procedure nor prosthetic management by the ocularist can guarantee success. Failure for the patient to recognize the symptoms and complications of contraction will usually lead to an unfortunate conclusion; lack of prosthesis retention. This is why it is important that all active participants understand their role, their abilities, and the need for open communication.

The LaFuente pressure mask allows not only the ocularist a unique tool in the management of the contracted tissue, but it also puts control into the hands of the patient, allowing them to be the frontline defense in their treatment. Quite often these cases can be stable for weeks to months postoperatively. It is the experience of our clinic, that a bout of contraction usually occurs within the first three months succeeding surgery. Previously, failure for the patient to present themselves to the ocularists to redefine the device commonly resulted in a diminished socket or a contracted socket unable to retain an ocular prosthesis. A patient that has been properly trained will be able to identify the changes occurring during the initial onset of contracture.

KEY WORDS: contracted socket, pressure mask, ocular prosthesis, oculoplastics, socket management

Pauline Slorach
B.C.O., B.A.D.O.
Webb Ocular Prosthetics
Toronto, Ontario
Canada

Michael Webb
B.C.O., B.A.D.O., F.A.S.O.
Webb Ocular Prosthetics
Toronto, Ontario
Canada
It is at these moments that the pressure mask can be incredibly useful in establishing balance. The utilization of orthodontic elastics allows for compensating pressure, creating greater volume and stability within the socket. Most importantly, these bouts of contraction do not always stop within the first year after surgery, they can quite often present intermittently on an ongoing basis. A socket that contracts without notice needs an effective ongoing management strategy, and that is precisely what the Lafuente pressure mask offers.

FABRICATION OF THE LAFUENTE PRESSURE MASK

The following is a step-by-step instruction on how to construct the device. Most materials required can be found in the ocularist’s laboratory or at dental supply companies.

Fabrication Procedures

Petroleum jelly is applied to the forehead, around the hairline, around the orbits, nose and upper cheeks (Figure 1). Gauze is cut to cover eye sockets, coated in petroleum jelly and placed over the eyes (Figure 2).

A swimming mask with the anterior lens removed is worn to contain the impression material (Figure 3). Any areas of escape are reinforced with medical tape or held tightly by the patient. The patient should be reclined and their clothing draped for protection.

A large quantity of slow setting alginate is mixed and promptly distributed into the confines of the mask, leaving a small space of approximately 1cm in depth for
the stone reinforcement (Figure 4). This should be swiftly worked into all edges so the space is completely filled.

Once set, gauze is applied over the surface of the alginate (Figure 5). A half an inch of fast setting plaster is mixed and applied over the surface of the alginate and gauze to act as reinforcement and preserve the integrity of the shape (Figures 6A and B).

Once the stone has set, the mask is removed carefully from the face and placed on a work surface with the negative alginate impression facing upward. Care must be taken not to crack the thin stone layer. The impression should be checked for imperfections and corrected with wax (Figures 7A and B). A 3-inch strip of construction paper with an inside lining of wax paper is taped around the periphery of the mask, making sure to reinforce any areas that stone may escape (Figure 8A). Buff stone is mixed and poured into the negative impression, trying to keep the stone confined to the shape of the mask (Figure 8B). Any excess can be ground off manually at a later date, although this can be quite tedious.
The negative stone impression, once set, is removed from the alginate impression, trimmed for easy release, and placed in the vacuum press (Figures 9 A, B, and C). Due to the large size of the mask a custom press may need to be fabricated for this purpose.

Once the mask is vacuum formed it can be removed and shaped for fit and comfort. The general outline for the final mask is drawn (Figure 10A). Both eye sockets are drawn and removed with a hand tool (Figure 10B). All edges should be rounded and should not dig into the face. Both eye sockets will be outlined and removed (Figure 10C and D).

At this time a custom conformer will be fabricated. A conformer the patient has been currently using can be copied and fit with a stem to work in conjunction with the mask. This stem should be approximately 7cm to 8cm in length (Figure 11). A slight indent is drilled into the central anterior of the conformer. This circumference of the indent should be slightly wider than the stem.

A fine notch is drilled into the tip of the stem (Figure 12) in order to hold the orthodontic elastic. The base of the stem is glued into the indent and left to set (Figure 12).

A 5cm to 6cm length by 1cm width piece of vacuum forming plastic is cut to become the support for the stem. This piece is formed into the shelf by heating the center with a torch and bending the plastic into a ninety-degree angle. It can be heated again, once glued to the mask in order to attain the proper position of direct pressure. This can also involve torquing the shelf into the desired angle. This piece can be attached to the mask with cyanoacrylate glue and held in position with a clip until set (Figures 13A and B).

Clear tubing with a central channel is now cut to 2cm in length. The bottom edge should be ground flat in order to lie atop the superior surface of the shelf. This tubing must have enough clearance through the center to allow the stem of the conformer to pass through. Using the cyanoacrylate glue, attach the piece of tubing once the shelf has set (Figure 14).

A slit must be drilled onto either side of the mask to allow for head straps. These straps should be sturdy
FIGURE 10A General outline.

FIGURE 10B Outline eye sockets.

FIGURE 10C Trimming the mask.

FIGURE 10D The mask after trimming.

FIGURE 11 Custom conformer with stem attached.

FIGURE 12 Notch drilled into stem.
and fairly wide with Velcro at the ends. The straps can be threaded through the mask and must be securely sewn into place.

The mask can now be used. An orthodontic rubber band is looped around the base of the tubing, closest to the face (Figure 15A and B). Insert the long stemmed conformer into the socket and hold it in position. Carefully place the mask onto the face, threading the conformer through the tubing. Connect the straps behind the patient’s head (Figure 16).

To apply pressure, pull the orthodontic band so that it fits into the notch at the end of the conformer stem. This will apply a focused, direct pressure into the socket at the angle and position intended.
CONCLUSION

The LaFuente pressure mask can be a valuable asset when dealing with cicatricial contraction within the socket. It can be utilized on demand by the patient over the course of a lifetime when contraction becomes an issue (Figure. 17). It is a simple design that can save the patients fornices, allowing them to retain an ocular prosthesis. What is required of the ocularist is a proficient knowledge of these difficult sockets, patience, and the ability to focus compensating pressure directly where needed. It can be manipulated and altered for years, making changes whenever necessary. The pressure mask is a device that has the ability to benefit the patient, ocularist, ophthalmologist, and oculoplastic surgeon alike.
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CORRESPONDENCE TO:

Pauline A. Slorach, B.C.O. B.A.D.O.
Webb Ocular Prosthetics
170 St. George St. Suite 707
Toronto, Ontario  M1N 3R6
Canada
Email: pauline@webbocular.com

FIGURE 18 A and B This gentleman utilized the LaFuente pressure mask over the course of many years and was able to retain a prosthesis successfully in a socket that originally lacked an inferior fornix.
Syndromes and Abnormalities Associated with Congenital Microphthalmia

ABSTRACT: Fitting and fabricating ocular prosthetics for patients with congenital microphthalmia can be rewarding but it can also be very challenging. This paper will review recent patient cases of congenital microphthalmia, accompanied with syndromes and abnormalities that were seen at our office and at the Alberta Children’s Hospital. In some cases, the syndromes and abnormalities that the patients presented with often made it difficult to fit them with an ocular prosthesis. The cosmetic results varied, from fair to good in relation to the corresponding underlying syndromes and/or abnormalities. The cases presented will demonstrate the cosmetic results achieved with these patients.

INTRODUCTION

In the past several years there has been an increase of congenital microphthalmic patients seen in southern Alberta. Congenital microphthalmia is “an abnormality in size and function of one or both eyes. It can be associated with other syndromes and additional congenital abnormalities.” When this developmental disorder occurs in a child in combination with additional congenital anomalies, it presents unique challenges for all medical professionals involved, including the ocularist.

When fitting pediatric patients with an ocular prosthesis one should proceed gradually. Early socket expansion is extremely important, as it typically results in better symmetry. Optimal expansion should start shortly after the infant is born, as the majority of orbital growth takes place in the first five years of life. Care must be taken not to over expand the socket and cause irritation to the surrounding tissue. Over expansion can cause irritation and inflammation to the socket.

WHAT IS THE DIFFERENCE BETWEEN A CONFORMER AND AN OCULAR PROSTHESIS?

A conformer is a temporary convex-shaped device that the patient can wear prior to receiving an ocular prosthesis. It is usually made of clear plastic and can be customized at an ocularist’s office. The size of a custom conformer can be as small as 5mm to as large as 30mm in both horizontal and vertical dimensions. The sizing is similar in shape to that of a triangle. An ocular
prosthesis is an artificial eye which is a custom made, hand painted, acrylic device that looks similar to that of a normal eye. A series of acrylic conformers are used to start expansion therapy for patients with congenital microphthalmia. This is done to expand the bony orbit and stimulate the growth of the bony structure surrounding it. The initial conformers that are fit for a congenital microphthalmic patient are small in size, typically less than 10mm horizontally (Figure 1A). When taking an impression on these small sockets, one must have custom impression trays available (Figure 1B). An ocular prosthesis can be fabricated once the horizontal size is greater than 10mm (Figure 1C). In our experience when the child's appearance looks normal the parent(s) are more likely to accept that the child wears an ocular prosthesis.

TREATMENT

The child's ophthalmologist will examine, evaluate, and discuss with the parent(s) what treatment options are available. Not all congenital microphthalmia patients will be fit with an ocular prosthesis or a conformer. Some children with congenital microphthalmia may have limited vision in the eye so an ocular prosthesis may not be required. When ocular prosthetic treatment is recommended for patients it will help expand the bony orbit as it grows. By expanding the bony orbit, the patient will be able to obtain greater facial symmetry. It is recommended that the patient meet with the ocularist prior to an ocular prosthetic fitting for a consultation and an assessment of the eye. At that time the ocularist should document:

1. if the patient has bilateral or unilateral congenital microphthalmia;
2. is vision present in any of the eyes; and
3. are the eyelids normal in appearance and size?

The next steps for the ocularist are as follows:

1. Measure the length of the eyelids;
2. Note if an eyelid coloboma or ptosis is present;
3. Note any additional congenital syndromes or abnormalities.
4. Take photographs of the eye and eyelids for future reference.

By following the above steps, the ocularist will be able to determine how the orbital expansion is proceeding while continuing to work on the case. It will then be easier to provide a treatment plan to the families and
other medical professionals involved once this infor-
mation has been collected.

Case Study 1

The male patient presented with a right microph-
thalmic eye with cyst. The referring ophthalmologist
indicated that the cyst appeared isolated to the orbit.
The child also has the genetic condition, Rubinstein-
Taybi syndrome.

This uncommon syndrome occurs in an estimated
1 in 100,000 to 125,000 newborns. Rubinstein-Taybi
syndrome is a condition characterized by short stature,
moderate to severe intellectual disability, distinctive

FIGURE 2A Part of the Rubinstein-Taybi Syndrome is broad thumbs.
FIGURE 2B Part of the Rubinstein-Taybi Syndrome are broad first toes.
FIGURE 2C Patient with most recent ocular prosthesis fit.
facial features in addition to broad thumbs and first toes (Figures 2A and B). However, the specific signs and symptoms vary among affected individuals. People with this syndrome have an increased risk of developing tumors and unfortunately, leukemia occurs more frequently in people with this syndrome. Rarely, Rubinstein-Taybi syndrome can involve serious complications such as: a failure to gain weight; failure to grow at the expected rate; and life-threatening infections. Infants born with the severe form of disorder usually survive only into early childhood.2

This case presented many challenges for the ocularist. The cyst that was present along with congenital microphthalmia helped the orbit expand as it mimicked the volume to that of an ocular implant. The location of the cyst caused the ocular prosthesis to migrate superior, which affected the gaze of the ocular prostheses. The cyst was left intact for the first year of the patient’s life. Later the cyst was removed and a dermis fat graft was placed in the socket. Blepharoplasty of the upper eyelids was performed to correct the ptosis. Following the surgeries, we were able to obtain good socket growth and expansion due to the collaborative care from the family, ophthalmologist, and ocularist (Figure 2C and D). The child was delayed in growing, walking, crawling, and presently the child does not speak. For these reasons, strong parental support is required for children with this condition as they will be spending numerous hours at various medical offices throughout the child’s life.

Case Study 2

The female patient presented with a microphthalmic right eye with cyst (Figure 3A). The infant also presented with an eyelid coloboma (Figure 3B). “An eyelid coloboma is a congenital abnormality in the structure of the eyelid that results from derailed or incomplete cell migration in the embryogenesis.”3 It most commonly affects the upper eyelid. An examination under anesthetic was performed with the ophthalmologist and ocularist present. The cyst was then excised surgically, with no bleeding or other complications following removal. The child did not have any other associated syndromes. A custom conformer was then fabricated and once the size of the expanded conformer was greater than 10mm horizontally an ocular prosthesis was fabricated with a painted iris. It is extremely important for the affected families to visit the ocularist every 3 weeks to 4 weeks in the first year of life. Early intervention produces great results if that occurs (Figure 3C). Once the parents see their child with that first custom artificial eye and realize that it restores their child to a more normal appearance, it can be a major factor in helping the parents adjust and begin to cope with the issue of vision loss. Further, it can advance the realization that their child will be wearing an ocular prosthesis for the rest of his/her life.

Case Study 3

The female patient presented with bilateral microphthalmia (Figure 4A). Ocular prosthetic fittings were completed on the right eye only as the patient has some vision in her left eye. The child is currently being investigated for other co-morbid conditions including hydrocephalus, which the primary characteristic is, excessive accumulation of fluid in the brain.4 This possibility was still being explored at the time of pub-
The patient is currently being followed by a neurologist, a pediatrician, pediatric ophthalmologist, and an ophthalmic plastic surgeon. When the patient was two months old, ocular expansion of the right eye began with a conformer. The first ocular prosthesis fabricated for the patient was at four months of age (Figure 4B and C). Due to the extremely young age of the patient, gentle care was taken when doing the fittings. No complications have arisen and overall the patient is doing very well.

Something to consider when seeing patients with additional conditions and/or syndromes is that they may be visiting many health care providers during that time. One should have patience and be accommodating when scheduling appointments as they may not be able to visit during regular office hours, or normal appointment times. To optimize efficiency, while the patient was under anesthetic, she was examined by
FIGURE 3C Patient fit with an ocular prosthesis.

FIGURE 4A Bilateral microphthalmia, notice the right eye is smaller than the left eye.

FIGURE 4B After a series of conformers were made she was able to be fitted with an ocular prosthesis.
three specialists. The ocularist took an impression for her ocular prosthesis under anesthesia to optimize the outcome. This helped reduce the number of additional appointments that the patient would have needed to schedule and made it easier for the ocularist to take an impression.

Case Study 4

The female patient presented with a right microphthalmic eye. The left eye appears to be normal. The patient also has congenital ectopic kidney and heart murmurs. In the first few weeks of life, the right eyelid
was ptotic, but later improved (Figure 5A). The patient was fit with a custom conformer at five weeks of age. The conformers were gradually expanded every 3 weeks and the patient had a life-like prosthesis at four months of age (Figure 5B). The palpebral fissure is presently smaller than the child’s sighted eye, which in time can be corrected. At 10 months of age the patient is doing very well and there have not been any complications due to the ocular prosthetic fittings (Figure 5C). The patients growing rate is just below normal of a child of similar age. There are no complications related to the ocular prosthesis and at this time, none are expected.

CONCLUSION

Collaborative communication between the ophthalmic plastic surgeon, ophthalmologist, ocularist, and family give the patient the highest chance for optimal results. When treating these patients, knowledge of other present syndromes and conditions outside of the ones that impact the ocular prosthesis will assist in providing greater patient care. Communication with all health care workers when caring for these patients is vital to providing optimal results for the patient. Some patients may proceed with surgical intervention and some may avoid it completely, which is the decision of the patient and family. The ocular prosthesis may not look equally balanced as the sighted eye due to limitations from these conditions and underlying syndromes. There also may be cosmetic or fit limitations due to the conditions and syndromes. The ocularist will find it very helpful to use photographs for documentation. These photographs are great for record keeping and can also be helpful for teaching patients. While the cases discussed have been challenging they have also been very rewarding.

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CORRESPONDENCE TO:

Shirley D. Weyland, B.C.O., B.A.D.O.
Calgary Ocular Prosthetics Ltd.
415 – 7015 Macleod Trail S.W.
Calgary, AB T2H 2K8
Canada
Email: shirl.eyes@shaw.ca
Changing the World One Eye at a Time: Practical Considerations for Serving in the Developing World

ABSTRACT: While not the oldest profession in the world, the ocularist's profession is certainly among the most unique in the world. When you consider that the American Society of Ocularists has just over 200 members worldwide it becomes readily apparent that much of the developing world has no access to a qualified ocularist making our services in great demand. In this day and age there are a multitude of opportunities available for humanitarian and service work in the developing world for those with specialized skills, be they medical or technical, or for those simply willing to serve. This paper will look at a number of the practical considerations that we feel should be taken into account before one takes the leap and heads overseas to participate in volunteer work.

INTRODUCTION

Over the years the authors have had requests to come and provide ocular prosthetics to patients in Bangladesh, Romania, Cameroon, Niger, Nigeria, Mozambique, Belize, Peru and the Dominican Republic. Often accompanying these requests was a lack of understanding on the part of those inviting us with respect to the complexities of fitting and making artificial eyes. They perceived it as a very simple process that could be completed with a minimum of effort and equipment. Each of these countries posed their individual opportunities and challenges as well as risks and obstacles. Individually and collectively the authors have observed or been involved in medical and humanitarian service work in Niger, Nigeria, Mozambique and Romania. We have had collectively, as of the time of this writing, the opportunity to make eight trips to the Dominican Republic to work as ocularists in a clinic that serves the poor of that nation (Figure 1). This paper is based on those combined perspectives and experiences.

Through those eight trips to the Dominican we have provided ocular prosthetics for approximately 130 patients in addition to providing follow-up and assessment for numerous other patients. In conjunction with these trips to the Dominican Republic we have also had the opportunity to serve and work at an orphanage.

We have been astounded by the immensely positive response we have received from people when they hear about our work in the Dominican Republic. Over the past eight years, as we have shared our experiences with

Ian McRobbie  
B.C.O., B.A.D.O.  
LeGrand Northwest Ocularists  
Edmonton, Alberta, Canada

James Willis  
B.C.O., B.A.D.O., F.A.S.O.  
LeGrand Northwest Ocularists (2013)  
Edmonton, Alberta, Canada

Jon Koroscil  
B.C.O., B.A.D.O.  
Prairie Ocular Prosthetics  
Saskatoon, Saskatchewan, Canada

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literally hundreds of people, there has been much interest expressed by others wanting to participate in a similar experience.

We have come to realize that while there are a number of personal stories about the work ocularists have done in the developing world, there was little in the way of guidelines and information about how to go about pursuing this kind of work. Some have published their story in the *Journal of the American Society of Ocularists* and the *Journal of Ophthalmic Prosthetics*.1,2,3,4,5 If you are considering participating in service work of this nature then these articles are well worth reading. They provide an excellent range of experiences and information detailing trips to Honduras, El Salvador, India, Haiti, and Russia.

Based on our experiences, first, as we spent several years deciding the practicalities of where in the world to go work and second, setting that plan in motion, we realized that there were many issues that had to be carefully assessed before we took the plunge and jumped into serving overseas. The goal of this paper is to provide some basic information as well as to pose a series of questions that we asked and answered for ourselves and which we ultimately hope will challenge and encourage you to not only make the choice to participate in this life-changing event, but to also make your experience a much more rewarding experience (Figure 1).

**WHY IN THE WORLD?**

Why in the world would you spend several thousand dollars and leave the comforts of home and go work somewhere where you most certainly will be uncomfortable and will definitely be challenged on many levels? Why? Because we strongly believe you can literally change the world one life, and one eye at a time. These opportunities allow you to share your skills with people who cannot do anything in return for you except give you the incredible satisfaction of having literally changed a life (Figures 2A, B, 3A, and B).

These trips have given us a bigger world perspective. Having seen first hand the needs, it has given us a vision for how to best invest our resources to meet those specific needs (Figure 4); given us an appreciation for our healthcare system as flawed as it may be; and given us a better understanding of the strength and courage of the human spirit evidenced in the lives of the patients and individuals with whom we have worked.

As an unplanned spinoff, we have experienced a stronger relationship, credibility, and respect with our patients and the medical community we serve in Canada. In our home clinics we have photo albums and a digital picture frame on the desk where we work with patients showing some of our work and patients overseas. We have received an amazing positive response from our Canadian patients. After seeing the pictures and hearing the stories they have often donated funds and/or supplies like backpacks and school supplies for us to take with us on our trips. Some patients have even expressed great gratitude that we would take our life-changing skills that we have provided to them, and share with the poor. And the first words out of many patients’ mouths when they return for their yearly appointments are, “So tell me about your latest trip.”

We received a resounding round of applause when speaking at an ophthalmology conference when we briefly spoke about our work in the Dominican Republic. People lined up at the break following our lecture to speak to us and inquire if there was any way they could be involved in future trips.

On a flight back to Canada following a work trip to the Dominican Republic our laptop ended up being passed around to a number of the passengers so they could see pictures of our work at the clinic and the orphanage and as a result we had people on the plane donate money for the eye work and the orphanage. On
Another flight the flight attendants made an announcement midway through a flight telling the passengers what we were going to do and we received a round of applause from those on the flight (Figure 4).

One piece of advice and one caution we would like to give is that if this is going to be a one-time, bucket list type event for you and you are simply looking to complete just a single trip then we would encourage you in two ways. First, we would suggest you book a trip through an agency like Underdog Initiative (http://www.underdoginitiative.com/) a group that will literally plan everything you need for a successful service trip experience (while we have had some very positive experience with this group the authors do not have any financial interest in this agency). From booking your flights and accommodation to arranging service projects and R&R days; from supporting pre-trip training to providing fundraising ideas, this type of package insures the best possible experience. All you have to do is book the time off and show up for your service trip experience. It should be noted that they are not offering medical-based trips at this time but they are looking into the possibility of including this aspect in future trips.

Second, we would encourage you to not just show up somewhere and try to provide medical care or even to just help out. We strongly believe that you can do a real disservice to the people of a given country if you just show up, see a few patients and make yourself feel good and then leave to go back home. A friend of ours who has worked in Latin America for years calls this kind of approach “petting the poor.” Consider this statement that a Dominican patient made to us, “Don’t start here unless you can finish well. You come to make yourself feel good and then don’t come back. You use us to practice on and then you leave and go back to America.” Those were powerful words that we have taken seriously in adopting our long-term vision and plan for our work in the Dominican Republic.

Your motivation for why you want to do something like this will be the first determining factor in choosing what you will do and where you will go.

WHAT IN THE WORLD?

The next question to ask yourself is what you would like to do in a given country? Are you planning to use...
your medical-based or technical skills as an ocularist, ophthalmologist, nurse, pharmacist, carpenter, or mechanic or are you willing to do anything including sports, construction and maintenance, agricultural projects, painting a school, installing water wells, or being part of a feeding program?

A key piece of advice we would like to give is that regardless of what you hope and plan to do for work on a given trip, it is a good idea to be very flexible in both your attitude and your goals, as the job and project you envisioned and planned for may change at a moments notice. We know of a situation wherein the construction and medical supplies that were shipped months ahead of time never arrived and instead of their planned work, the team ended up running a sports program for a group of kids and then painting a school in a village. They still impacted lives, including their own, but not in the manner in which they had planned. We have had trips to the Dominican Republic where in addition to the ocularist work we have also ended up framing and pouring a concrete sidewalk, repairing a concrete roof on a dormitory, fixing a weed whacker, and replacing some plumbing in an orphanage. None of which were on our original “eye trip plan” (Figure 5 A and B).

A great example of being willing to change your plans was reflected in an iTeam trip to Haiti in 2014. Their team leader shared the following story via an email from February 19, 2014,

We came with our iTeam thoughts, perhaps more concrete for returning teammates than for first-timers. Either way, we could not anticipate these opportunities. After other items failed to materialize, Kim found herself in the Merriam Special Needs Center. Then a thought developed for Kim and her husband Todd into designing and building a walker for a 5 year old blind orphan who doesn’t have the leg strength to walk. It was made out of PVC water pipe, screws, a little plywood and some caster wheels. Now, a concrete creeper kid can roll and develop leg strength. (It is more than a little humorous that the best help a blind girl gets is not from a surgeon, but from a pastor’s wife willing to have her plans altered.)

FIGURE 3A and B Patient wore the same poor fitting prosthesis for over 20 years and then received a new custom artificial eye. She came into the clinic very self conscious and left with a beaming smile.
Regardless of whether you are traveling alone or participating in a group project we feel it is imperative to do some homework and gather as much information as possible before heading out.

The first question we asked ourselves was how safe is the country of interest? With current world events including conflicts, wars, terrorist events and health crises these are most certainly factors that will need to be seriously assessed. The ebola crisis of 2014 would make choosing one of the affected nations a risky option as a place to travel to fit ocular prosthetics.

Health and Tourist/Entry Visa requirements vary widely between countries and these issues may also be determining factors for you due to the related expenses and complex entry requirements. Entry visas are required for many countries and they require that your passport must be valid for a minimum period of six months. For some countries the visa can be purchased right at the airport of entry, whereas other countries may require you to mail your passport to the nearest embassy and you may be without your passport for two to four weeks. For example, if you were traveling to Niger, West Africa you must apply for the entry visa well before your trip and the visa could cost as much as $234 CAD in addition to the courier fees for your passport. By comparison, the entry fee for the Dominican Republic is only $10 and the airline we fly with provides the entry visa card to us on the flight, making this a very simple process. According to the following website, (http://www.adventurealternative.com/countries/page/105/tanzania_visa) the entry visa for Tanzania, as of the time of this writing, could be obtained at most of the airports of entry but it still requires you to have completed a form prior to traveling and the visa fee varies depending on the country of your citizenship. Apparently there is now a requirement for all visitors to Tanzania to provide biometric fingerprints and photographs on arrival and departure.

Our point in mentioning all of this is not to discourage you, but to make you aware of the potential complexities, timelines, and costs, all of which may affect your decision to go as a volunteer to certain countries.

Immunizations, typically yellow fever, are required prior to entering a number of countries. These immunizations and other related medications can be quite expensive and these items may not be an expense you are prepared to incur, so do your home work before

WHERE IN THE WORLD?

The opportunities to serve worldwide are virtually limitless. However, there are many factors to be considered before choosing a country in which to work.
signing on for a project. Your host agency will typically advise you of any requirements but we would encourage you to do your own homework to insure you have current and accurate information. On the Canadian Government’s website for travel they make the following statements “No matter where in the world you intend to travel make sure you check your destination country’s travel advice and advisories page twice: once when you are planning your trip and again shortly before you leave” and “You are solely responsible for your travel decisions.” Important words of advice.

Below are some government websites for both Canadian and American travellers which provide lots of great, current information covering advisories and alerts, security issues, entry/exit requirements, health requirements, laws and culture, and climate for the country of choice.

- http://travel.state.gov/content/passports/english/country.html
- http://travel.gc.ca/travelling/advisories

It is well worth your time and effort to spend sometime reading through the information presented.

For the most current health issues and immunizations requirements for travelers it would also be recommended that you consult the Center For Disease Control website (www.cdc.gov).

Choosing where to go will also determine to a degree what kind of work you may be able to be involved in. For example, if you were planning on working as an ocularist in a remote part of Africa you may not have access to electricity to run any of your equipment, nor may you have an appropriate place to work. Many developing world clinics rely on gas-powered generators to supply the electrical needs and these can be a great asset – as long as they work (Figure 6). These are details you need to establish prior to your trip.

Travel times and related travel expenses may also be a factor in choosing your travel destination. For example, if you were traveling from the United States or Canada to work in the Dominican Republic, your total flight times may be only four to eight hours and because it is a tourist destination there are many reasonable, inexpensive travel options available, whereas as if you were going to work in Africa your travel times one way could exceed 30 hours and the airfares and in-country expenses can be substantially higher.

If you are planning to tack on other travel experiences onto your service trip, then these additional times and expenses may be a moot point. If you were planning to do a safari in East Africa or perhaps climb Kilimanjaro, then staying an extra week or two in country to be involved in a humanitarian project may be a very viable option for you and make the travel times and expenses worthwhile.

**FIGURE 6** Many parts of the world rely on gas generators to provide the electrical needs. Shown here, is a large gas-powered generator in Mozambique receiving maintenance to insure a reliable source of electricity for the mission compound. Having it on a wheeled trailer allows it to be located wherever it is needed.

**FIGURE 7** Jim’s son and daughter-in-law with their Compassion Canada sponsored children in Rwanda. They coordinated this visit with a humanitarian project.
expenses well worth the effort. We also know of several people who chose to do service work in a country where they also had sponsored-children with World Vision or Compassion Canada and they were able to arrange to meet up with their sponsored children (Figure 7). This type of meeting typically requires months of planning, including police background checks and clearances, in order to protect the children and permission is not always granted. But if it can be accomplished it is an immensely rewarding experience.

**WHO IN THE WORLD?**

Once you have determined that you would like to work in the developing world and have decided what you would hope to do and where in the world you would like go then its time to find an agency or group to work with. We have listed a few groups below along with their contact information that you can use as a starting point. Some of these groups provide medical services and others have a range of projects that they offer.

The best place to start would be to talk to some of your peers who have already been involved in similar work. They can give you the name of the group they worked with and share their experiences with you and give you a place to start. If you are looking specifically for a faith-based group to work with then you can often start with your own church or place of worship. Many denominations have health or work related agencies that routinely take groups to work overseas. It is important to find a solid, reputable group that you feel comfortable to work with.

Below are listed a few very reliable groups and their contact information and brief mission statement that you can use as a starting point depending on what type of work or project you are looking to participate in. The first two agencies offer a variety of projects and opportunities including medical work and a number of ocularists from the American Society of Ocularists have been involved with these two ministries. The third agency offers opportunities for service for those with technical, trades, or mechanical skills. The fourth agency is for those looking to participate in a general a range of projects including house builds, playground restorations, and painting projects and to do this with coworkers, as a school group or for families with their children.

- **Haiti Christian Mission (Haiti iTeam),**
  http://nwhcm.org/

- **Island Impact Ministries, http://www.island-impact.net/**
  Island Impact Ministries is a U.S. registered, 501(c) non-profit organization established in 2003 and dedicated to providing much-needed medical, educational, spiritual, and construction assistance to the people of the Dominican Republic and Haiti. These goals are accomplished through our local medical clinics, child sponsorship schools, and hosting visiting teams. Medical teams provide mobile clinics in remote locations, or offer free surgeries, vital medicines, and supplies to people who need it most. Construction teams focus on projects to improve and repair schools, clinics, hospitals, and orphanages.

- **Mercy Tech, http://mercytechmission.com/**
  Mercy Tech is committed to fighting poverty world-wide by teaching life-changing, employable skills to those living in developing countries. If you are an experienced trades-person or professional with skills that you can pass on to those eager to learn, then contact us for further information on how you can make a difference in someone’s life.

- **Underdog Initiative, http://www.underdoginitiative.com/**
  Are you ready for an adventure that could change everything? Are you looking for an opportunity to be involved in an authentic experience that’s more than just “seeing the world”? The Underdog Initiative team specializes in helping groups of students, co-workers and families contribute in meaningful ways as they experience a different culture, meet new people and broaden their perspectives. It’s all about serving in real ways. The Underdog Initiative
can help you plan a service trip that is guaranteed to get your boots dirty.

WE’RE NOT IN KANSAS ANYMORE

“Toto, I’ve a feeling we’re not in Kansas anymore.” While this is a familiar and often repeated statement it is critical to understand that you are now operating in a new country that may have significantly different laws, culture and customs from home. You can quickly get yourself in trouble if you are not prepared. Everything from dress codes, to how to greet people, driving laws, smoking, and consumption of alcohol, to simply taking pictures may have very different parameters from back in “Kansas.” So go prepared. Embrace the simplicity, the diversity, the color, the

FIGURE 8 Embrace the uniqueness of your surroundings. A. A butcher shop in Africa. B. African school children excitedly awaiting their lunch. C. A poor neighborhood in the Dominican Republic. D. A creative motorcycle driver in the Dominican Republic delivering a chair. E. A unique and colorful sign for a pub in Moshi, Tanzania.
beauty and uniqueness of the culture, the food and the people. The sights, smells, sounds, traffic, and poverty can be an amazing kaleidoscope to your senses. This is where it really pays to be a part of a group so that you have people who know the country, the customs, and the language. You will have some peer support as well (Figures 8 A, B, C, D, and E).

The agency that you will be working with will typically give you the guidelines ahead of time. Your first time in a new country can be both exciting and very overwhelming.

Based on our experiences in Africa, Eastern Europe and the Dominican Republic, we would like to give three examples of things that might be potential issues. The three items are dress codes, taking photos and related social media, and bringing gifts or supplies to give away to the nationals.

Dress Codes

When we work at the clinic in the Dominican Republic, we typically work in short pants as it is very hot in the clinic as there is no air conditioning (Figure 9). The clinic director gave us permission to dress in this manner. However, there are many countries in the world where it would be totally culturally unacceptable to have your legs exposed. Always check with your host agency as to what is appropriate to wear.

Photography

One of the first things we like to do upon arriving in a new place is to take photos. One critical piece of advice that we would like to offer would be that upon your arrival in the country consult with your host group as to what the protocols are for taking pictures. For example, taking a picture in Africa can often draw an immediate crowd (Figure 10). While it can be a great opportunity to build some good relations with the people of the community, it can create some tensions as sometimes people want money from you for having taken their picture. They can get quite aggressive about it. So be very careful and when in doubt put the camera away. You can probably find a similar photo on Google and save yourself some trouble. With the digital camera you can instantly show the individuals who have suddenly appeared in your photo the picture of themselves and this can be an immensely entertaining event.

Be very careful if using a smartphone as they are easy to grab out of your hands while you are taking a picture.

And if you are planning to post the photos on any type of social media, please, please, please get your host agency’s clearance about what you post. A careless photo or comment can literally undo years of relationships that they have been built with the people.

FIGURE 9 Dress code issues. While wearing short pants at the clinic in the Dominican Republic is totally appropriate, there are numerous countries in the world where it would be inappropriate. Let your host agency provide the guidelines for appropriate attire.

FIGURE 10 Taking a photo can instantly draw a crowd. Embrace the moment and use your digital camera to build relationships and show everyone how they look on film.
It is critical to be aware that many countries in the world DO NOT allow you to take photos of the airport facility or the tarmac, and most certainly DO NOT take photos of customs/immigration officers, soldiers, policemen, or security guards unless they have given you permission (Figure 11). Jim had an experience years ago in an African country where someone in his group took a picture of a market stall from inside the vehicle not realizing that a policeman was standing in the area of the photo. The policeman immediately rushed over and demanded the camera and then placed all of them under arrest. Fortunately, they were traveling with a member of the host agency they were working with and he was both fluent in the language and culture. After a time at the police station he was able to negotiate their release with the only loss being the film in the camera (pre-digital camera era). A valuable lesson learned though.

**Supplies and Materials**

Many host groups will ask you to bring specific supplies and materials with you that they cannot easily purchase in country. If you are planning to bring gifts to distribute to the nationals we would again encourage you to let the host group provide the guidelines and direction for distribution of those items (Figure 12A, B, and C). By having a controlled distribution,
at the hosts’ discretion, it prevents the nationals from having an atmosphere of unrealistic expectations from future teams.

Depending where in the world you end up, you may also have to contend with “critters” that you may not have back home. Friends of the authors recently discovered one night eight scorpions in their bedroom in Mozambique one of which was in their bed and stung one of them. Certain parts of the world have numerous poisonous snakes and spiders and there may even be the occasional crocodile to contend with (Figure 13 A,B, and C). Allow your hosts to give you advice on where to walk or swim. Be very cautious and carefully heed their advice.

THE WORK ENVIRONMENT

The clinic where you are working will most certainly not be like your home clinic. Embrace it as an opportunity and get creative because you are almost guaranteed to face some challenges. On Danny Acosta’s trip to Honduras there was no electric hotplate available for curing the plastic in the prostheses so he had to improvise by boiling water over an open fire.6 On her trip to India, Dori Hosek encountered high ambient air temperatures in the clinic which resulted in the impression material setting up while it was still being mixed. She also encountered daily power failures, which further complicated her work.7 These types of events are very common in the developing world so be prepared to think outside the box and be flexible in your schedule.

Our patients in the Dominican Republic are all self-referred as opposed to being referred by an ophthalmologist and they typically present with very vague medical histories. The agency we work with advertises our clinic dates on the radio and local TV stations and patients then contact the clinic for further information. Ninety-nine percent of them have not seen an ophthalmologist since their eye was either enucleated or the injured eye repaired. Many have gone years with no prosthesis or conformer in the socket yet surprisingly few of them present with contracted sockets. The reason they have gone without a prosthesis for so long is twofold. One, there is not an indigenous ocularist in the area where we work and secondly even if there was, the patients most likely could not afford the prosthesis anyway. One thing we wanted to be sure of was

FIGURE 13  A. A tarantula that had taken up residence in one of our group’s running shoe in the Dominican Republic. B. A captured crocodile near a rural school in Mozambique. C. A large centipede in Mozambique – it can give a painful sting. When working in tropical climates always shake out your shoes and clothes each morning to prevent an unexpected and painful surprise.
that through providing our services we were not taking work and income away from an ocularist in the Dominican Republic. We did some homework and the nearest ocularist in the country is about a six hour drive away and they only provide services for those who can pay, so we felt we were OK to continue our work.

Since none of the three of us spoke Spanish we required a translator. We have to pay for this individual’s services and it took us several trips before we found a translator that we felt could properly convey the questions we were asking as part of the patient history.

When we were first asked to come and work at the clinic we made it very clear that until we could come and assess the clinic environment we were not sure what we could do for the patients. We were very careful not to make any promises that we could not keep. We came prepared on that first trip with over 100 eyes that we had made in our home clinic in Edmonton, and planned that initially we would fit empirically (Figure 14). We quickly realized that we had some challenges. The room at the clinic in the Dominican Republic where we see patients is about the size of a small bedroom and it can get very crowded with three ocularists, a translator, the clinic director, and the patient with his/her family members (Figure 15). With a small work space, intense ambient heat (on a recent trip the temperature in the clinic reached 39°C (102°F) with the humidity, and the clinic is not air-conditioned), no running water in the room in which we work, and the lack of consistent electrical supply (the clinic has a gas generator to supply our electrical needs) we concluded that fitting empirically was going to be the best option for the foreseeable future. We have, however, been able to achieve some great results using this technique

Although the majority of eyes we do each trip are empirically fit with what we feel are excellent results (Figures 16 A, B, C, and D), we try to pick a couple of patients on each trip where we do a full fitting with impression and then take numerous pictures of the patient’s eye for coloring of the prosthesis. We then bring the mold and impression back to Edmonton where we manufacture the prosthesis and then on the next trip back we deliver the prosthesis (Figures 2 and 3). The clinic staff have been absolutely amazing and have done everything they can to make our trip as successful as possible. Patients are typically lined up out the door when we arrive each morning, some having traveled through the night and having been at the clinic since 6:00 A.M. They are seen in the order in which they arrived. We work straight through the day and do not turn anyone away. We typically see about 30 patients a trip and of those we would have fit 10 to 15 prostheses with the others coming in for follow-up. As an aside, while some ocularists have related that

FIGURE 14 Due to a combination of lack of space and lack of reliable and consistent electrical supply in the Dominican Republic, we have to pre-make a variety of different sizes and shapes of artificial eyes in our lab in Edmonton and then empirically fit the prostheses.

FIGURE 15 The room at the clinic in the Dominican Republic where we see patients. It can get very crowded with three ocularists, a translator, the clinic director, the patient with their family members, and sometimes other patients who come in to see what we are doing. The clinic is not air-conditioned so it can get very warm.
FIGURE 16 Although not the optimal way to fit an ocular prosthesis we have been able to achieve some excellent results with empirical fitting of patients in the Dominican Republic for both A,B (enucleations) and C,D (phthisical globes).
they charge a small fee for the prosthesis we do not charge the patients for the prostheses we provide. We made this decision based on the discussions with the mission group we are working with.

Some additional challenges that we face are that we do not have a sink in the room where we work so have to go to another room to wash our hands and rinse pumice off of the prosthesis and our hands. This makes things a little complicated at times but with all three of us working together we make it work. They are typically very long days but so rewarding.

Typically we also take many of our supplies including fresh supplies like rubber gloves and impression material for each trip. Be very careful that you are not transporting flammable or restricted items like methyl methacrylate monomer or methyl hydrate. If you require these types of materials you will have to plan well ahead as they typically have to be shipped months ahead of time (Figure 17).

CAUTIONS AND FREE ADVICE

- Mark your luggage with some sort of distinctive markings to make it easier to spot when you are collecting your luggage (Figure 18).
- Take Gatorade crystals to flavor purified water and it also helps with replenishing electrolytes in the heat.
- Before traveling be sure to check your suitcase, including all outside pockets or zippered storage areas on the suitcase, for any items that may be prohibited or embarrassing (things like dirty laundry from a previous trip). You may have a suitcase that has not been used for years and may contain items such as knives, syringes for things like insulin injections, or even some prescription medications, which may pose a problem in some countries.
- Make sure any personal medications are in their original, labeled pharmacy containers.
- Be aware that many travel insurance plans usually do not cover pre-existing conditions including pregnancy. Carefully read your plan before traveling.
- We prefer to travel with duffel bags. They are durable and if you take a duffel bag filled with supplies to be left on site, then the empty duf-
not always be the case as several African countries that we have traveled to, have demanded import duties that sometimes are equal to the value of the item being imported. Again this is where having people with feet on the ground can help you navigate some of these difficulties with customs and immigration.

• If you are transporting any kind of powdered materials in your suitcase like impression material or polymer, be prepared that customs and security officers may have concerns about the nature of these substances and you may be subject to an intense search (Figure 19). On a trip back home from the Dominican Republic Jim had a container of defective alginate in his suitcase which we were bringing back to Canada to have the manufacturer determine what had gone wrong with it. Airport security had done an additional screening process on his luggage after we had checked in and he was paged out of the boarding lounge into a secure area where armed guards and a custom agent conducted a very thorough search of his luggage, a search which included them sniffing and tasting the powdered material (alginate) before releasing the luggage. The alginate was in a clearly marked container however, the “bad guys” have probably attempted similar methods for smuggling illicit materials out of countries.

fel can usually simply be tucked into another duffel for travel back home, saving you extra luggage fees.

• Take a good quality flashlight and or headlamp for navigating in the dark. Include some spare batteries but not in your carry-on luggage as security may take them away.

• Take sunscreen as you don’t want to spoil your time in country with a sunburn.

• Carefully read the customs declaration forms for each country including your home country. You may have to declare any of the extra materials, supplies, and gifts you were bringing into the country and possibly have to pay customs duties. If you are working through an agency you can establish these protocols and procedures ahead of time so you’re not caught off guard. We have routinely taken numerous donated items into the Dominican Republic (things like a laptop computer, backpacks, sandals, school books and supplies, candy, etc.) that have often exceeded the custom’s financial limits for import in the Dominican. We have declared all of these items to their full price and when we explained to the Custom’s agent that the items were being used for an orphanage or medical clinic they cleared us through without having to pay any duties. This will
• Have fun with your work and the nationals. We discovered on one trip that Jim Willis bears a remarkable likeness to a past president of the Dominican Republic who was running for re-election (Figure 20). This gentleman was fondly known as “Papa” and many of our patients now call Jim “Papa” when they see him at the clinic.

Building relationships with people involves far more than just fitting artificial eyes or providing medical care. With the permission of our Dominican hosts, Jon Koroscil brought puppets and cartoon noses and mustaches. The joy, laughter, and relationships these two simple things created was priceless. We always end up in a very competitive game of baseball or basketball with the youth at the orphanage (Figure 21A, B, and C). It is important to remember that you are an ambassador for your country.

• Take every opportunity you can to teach people about ocularistry. Whether we are in a clinic, an orphanage, or on an airplane we use those situations to teach people about what we as ocularists do and how this profession impacts and changes peoples lives. (Figure 22A and B).

FIGURE 20 Jim Willis bears a remarkable likeness to a past president of the Dominican Republic, Rafael Hipólito Mejía Domínguez, who was running for re-election during one of our trips. This gentleman was fondly known by the poor as “Papa” and many of our patients now call Jim “Papa” when they see him at the clinic.

FIGURE 21 Building relationships with people involves far more than just fitting artificial eyes or providing medical care. A. With the permission of our hosts, Jon Koroscil brought puppets and B, cartoon noses and mustaches. The joy, laughter, and relationships these two simple things created were priceless. We always end up in a very competitive game of baseball or basketball with the youth at the orphanage. C. Ian McRobbie is trying to psych out the kids as we prepared to play baseball. Remember you are an ambassador for your country.
CONCLUSION

Regardless of your reason for wanting to go, understand that this will be a monumental, life-altering choice. These trips have truly impacted our lives and our worldview.

Plan to go. Plan well and do your homework. Peace be the Journey.

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Photos Figure 8 C & D used with permission from Summer Haslett.

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CORRESPONDENCE TO:

Jon Koroscil, B.C.O., B.A.D.O.
Prairie Ocular Prosthetics
411 135 21st Street E
Saskatoon, SK S7K 0B4
Canada
prairieocular@gmail.com

Ian McRobbie, B.C.O., B.A.D.O
LeGrand Northwest Ocularists
Cedars Professional Park
2903-66 Street NW
Edmonton, AB T6K 4C1
Canada
legrandnw@shaw.ca

James Willis,
B.C.O., B.A.D.O., F.A.S.O.
LeGrand Northwest Ocularists (2013)
Cedars Professional Park
2903-66 Street NW
Edmonton, AB T6K 4C1
Canada
legrandnw@shaw.ca
Passing the Torch: A New Generation Takes Over the Proprietorship of an Established Practice in Ocularistry

ABSTRACT: Apprentices working under the oversight of a mentor who have earned their status as a B.A.D.O. (board approved diplomate ocularists) are students of ocularistry. They are hoping to one day be established as professional ocularists. While it is absolutely necessary to learn the craft of ocularistry, it is also necessary to learn how to buy and operate an ocularist practice. Presented here is the experience of one former apprentice ocularist who became the owner of the practice that her mentor had established.

INTRODUCTION

The greater portion of the professional ocularist community is racing forward toward that time in which, at least on paper, they are considered as having reached retirement age. Those who have worked as apprentices under the oversight of these mentors hope to secure their future not only as professional ocularists but also as business owners. To purchase an existing business is no easy task. The amount of time necessary to work through the multitude of things that must be done not only by the seller and buyer, but also by the professionals who are necessary to the legal and equitable transfer of ownership.

ACQUISITION OF AN EXISTING COMPANY

I was working for my mentor/employer for many years and we had a very good working relationship. It was almost taken for granted that I would buy the company when he was ready to sell. The major question for me was whether it was financially prudent to buy an existing practice, knowing it would be expensive, or open a new office and build a clientele. In order to answer that question, I had to delve into an area in which I had no experience. The relationship I had with my mentor could have dictated that we simply come to a private agreement and cement it with a handshake. The business world on the other hand, requires certifications and guarantees that a handshake would not provide. It became apparent that I needed professional expertise to help guide me through the maze of permits and documents that

KEY WORDS: acquisition, mentor, business plan, corporation book, mandate of incapacity, good will.
would be coming my way during the acquisition of this company (Figure 1). \(^1\)

Having come to a general agreement with my mentor, mainly the price and timeline, I started looking for an accountant and a lawyer specializing in business acquisitions. \(^2, 3\)

Of primary importance, my requirements for an accountant was that I be comfortable with him or her knowing that he or she would be integral to the success of my business. As far as the lawyer was concerned, I felt that his or her competence would be my only priority.

The first order of business was to provide my accountant with the documents necessary to assess the value the company and the sellers price. This required from the seller the previous five years of audited company statements. Having determined that everything was in order, I presented to the seller my offer and he accepted it. An offer can be made using an average of the last five years of sales as a guide. At that time, it was our intention to have the sale completed by December 31, 2012. I thought that it would give us plenty of time. I had absolutely no idea of all the time I would need to spend outside of work.

My second order of business was to work with the lawyer I selected. I filed the necessary papers to become incorporated. The Corporate book includes the Resolutions of the Company, the Shareholders, corporation information sheet, list of legal obligations, and all the documents relating to conclude the sale. Also necessary were specific documents:

- mandate of incapacity
- a notarized up-to-date will
- life insurance including a physical examination report
- disability insurance
- copies of leases for any office I would be working in
- proof of enrollment in paying agencies’ programs
- documents from the bank verifying accounts have been set up

I required that the lawyer draw up a sales agreement that essentially protected my interests in acquiring an existing practice. When all the required documents were gathered a formal contract was written. This document was so exhaustive and detailed that it contained fifteen pages of single spaced legal language. It covered the type of professional service to be rendered, who I was as a legal entity, the description of the assets both tangible and intangible and their value, and what the sales agreement-covered including:

- the inventory
- furniture
- technical equipment
- office supplies
- computer hardware and software
- files
- leases for offices
- the proof of the transfer of telephone numbers
- list of all the suppliers
- Goodwill

This contract also goes into detail of the value of the goods, description of the payment agreement, and describes my responsibilities in fulfilling the conditions stipulated in the contract. Another section describes my obligations, as an owner starting on the closing date, as to payment of employee(s), rent, tax bills, expenses, and dues related to the company. As for the seller, it stipulates that the existing company is in good standing, free of debt, with no delayed payments due to the government. It contains a non-competition clause, shows no lawsuit pending, and finally that the company is in good standing with labor and regulation standards.

This sales contract, with all categories classified under their respective titles, represents four months of intensive work and remains a source of information that I can turn to when required (Figure 2).

This contract was then presented to the seller and he in turn handed it over to his lawyer to ensure that

**FIGURE 1** Getting an education in the world of buying and selling a business.
his interests are covered. After much consultation between the seller’s lawyer, my lawyer and accountant, the contract was agreed to. A basic business plan had been constructed, but now with my offer and purchase agreement accepted, it was time to complete the minutia necessary to open my business. With a complete business plan in hand, I made appointments with two banks, two landlords, phone companies, and payment agencies from two different provinces. Once the details were finalized with all the interested parties, the seller and I met at my lawyer’s office on February 1, 2013 to finalize the sale (Figure 3).

RECOMMENDATIONS

It should be noted that all of the above steps took an inordinate amount of time to complete. At no time was it easy or quick. My advice to anyone contemplating the purchase of an ongoing business is to gather the best professionals, lawyer, and accountant that you can afford. In the long term, it will save stress and time.

Long Term Relationships

You will need long-term and continual relationships with an accountant, a bank, and funding agencies throughout the life of your business.

• Accountants: I mentioned briefly the importance of finding an accountant that you can work with. He or she will provide you with services on an ongoing basis that will free you to do what you do best.

Short Term Relationships

Theoretically your dealing with lawyers will be limited to the purchase of the company you are interested in. In this matter, choose the person whose expertise is centered on business acquisitions.

CONCLUSION

My decision to purchase an existing enterprise was based on the fact that the monies spent would bring me instant cash flow from a clientele that already knew me. The telephone number and the address of the office had been unchanged for many years, guaranteeing an ongoing line of communication. In essence, the changeover from the seller’s business to mine would be seamless. And it was. As always there are minor complications, but nothing to jeopardize the well-being of my organization. Bear in mind that you will expend more time and money than you budgeted for in your pursuit of your this objective.
REFERENCES


CORRESPONDENCE TO:

Marie-France Clermont, B.C.O., B.A.D.O.
Marie-France Clermont Ocularists, Inc.
1538 Sherbrooke Street West, Suite 852
Montreal. QC H3G-1L5
Canada
mfclermontocularists@gmail.com
Announcements

➤ 2015  Annual Meeting, Friday, November 13 to Tuesday, November 17, Las Vegas, Nevada (In Conjunction with American Academy of Ophthalmology meeting)

➤ 2016  Mid-Year Meeting, April 21, 2016 to April 28, 2016, Loews Don CeSar, St. Pete Beach, Florida

➤ 2016  Annual Meeting, Chicago, Illinois (In conjunction with the American Academy of Ophthalmology meeting)

➤ 2017  Mid-Year Meeting, Hyatt Regency Hill Country, San Antonio, Texas

➤ 2017  Annual Meeting, New Orleans, Louisiana (In conjunction with the American Academy of Ophthalmology meeting)

➤ 2018  Annual Meeting, Chicago, Illinois (In conjunction with the American Academy of Ophthalmology meeting)

➤ 2019  Annual Meeting, San Francisco, California (In conjunction with the American Academy of Ophthalmology meeting)

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Craig R. Pataky, B.C.O., B.A.D.O.
Todd A. Cranmore, B.C.O., B.A.D.O.
Edwin R. Johnston died November 8, 2014. He was eighty-one years old.

Edwin R. Johnston, was born on April 13, 1933 in Brooklyn, New York, although he lived most of his adult life in North Carolina.

Ed was introduced to ocularistry when he met and married Eleonore Kohler in 1954. Eleonore’s father was the late Hugo Kohler, (of Fried & Kohler), formerly of New York City. The Kohlers had a long history of making glass artificial eyes, in Germany.

Hugo Kohler introduced Ed to the art of making glass eyes, as his new wife, Eleonore, both assisted and translated for her dad. In the early 1950’s—before the establishment of the ASO in 1957—Ed found himself intrigued with the process of acrylic resin ocular prosthetics and began an apprenticeship with Mager and Gougelmann of New York.

After leaving Mager and Gougelmann in the late 1960’s, Ed collaborated briefly with Earle Schreiber in Newark, New Jersey, before opening his first practice in Parsippany, New Jersey. To have a central base from which to service his eighteen satellite offices along the East Coast—from the New York-Connecticut area to Florida. Ed relocated to Hillsborough, North Carolina, in 1977. Boston ocularist Ray Jahrling fondly spoke of Ed as “the most capable and efficient itinerant (traveling) Ocularist”.

Ed’s legacy as ‘The traveling eye man,’ had its foundations in his fondness for those patients unable to travel to a larger city to see him. He instilled in his apprentices the importance of taking a personal interest in the person. The kind and generous spirit Ed showed endeared him to many. He attributed his good nature to his faith for which he used as principles in his everyday life. The article “Peering into the world of Artificial Eyes” published in 1986, was written by Ed. It is an example of the dedication and passion Ed had in his chosen profession.

Regarding ocular prosthetics, Ed had a rich history he was a Board Certified Ocularist, and a Fellow member of the American Society of Ocularists. His daughter, Lisa Johnston, BCO,BADO, continues to follow in his footsteps in North Carolina as a fifth generation ocularist.

For over 50 years, Ed and Eleonore were known as the couple who was first on the dance floor and the last to leave at the American Society of Ocularists’ semi-annual banquets. He is survived by his dance partner and loving wife of 60 years, Eleonore, and their children, Dawn Hull, Bruce Johnston, and Lisa Johnston, along with grandchildren and great grandchildren.
Walter T. Tillman  
July 1, 1937--August 7, 2015

Walter “Bud” Tillman passed away on Friday, August 7, 2015. He was seventy-eight years old.

Bud was born on July 1, 1937, in Cologne, Panama, a son of Maria A. Aguilar Tillman, who survives in West Palm Beach, Florida, and the late Walter Thomas Tillman, Sr.

Bud was a veteran who had served in the U.S. Army. He earned a degree in Commercial and Fine Arts from Philadelphia College of Art in Philadelphia, Pennsylvania. He began his apprenticeship with Joe LeGrand Sr in Philadelphia in 1965. Along with Joe, Tom Dean, and Joseph Michel, Bud helped create many improvements involving custom ocular prosthetics as the ocularist profession expanded along with LeGrand Associates.


Bud was a Fellow member, and a frequent and enthusiastic lecturer for the American Society of Ocularists. He published several articles in various eye care journals. Bud self published the book, *An Eye for An Eye: A Guide for the Artificial Eye Wearer* in 1987. This ambitious and influential book was one of the first books regarding plastic prosthetic eyes. Several excerpts were published in the *Journal of Ophthalmic Prosthetics*.

In addition to his son Bud Jr., Bud is survived by his former wife Terrah “Terri” Alfred Tillman; daughter Teresa Johnson of Gilbert, Arizona; four grandchildren, Anthony “Tony” Tillman of Renton, Washington, Jennifer Tillman of Queens Creek, Arizona, Jason Johnson and his wife Lauren of Gilbert, Arizona, and Juliet Johnson of Gilbert, Arizona; and three great-grandchildren, Emily and Ethan McAfee and Ava Johnson. Also surviving are brothers George Tillman, Glenville, Pennsylvania; James Tillman and his wife Georgine, West Palm Beach, Florida; and his sisters, Maria McGlynn, West Palm Beach, Florida, and Linda Brighton, of Barrlett, Illinois.

Fine art was Bud Tillman’s passion and hobby his entire life. His passing leaves a deep void. He will be surely missed by his colleagues, patients, and family.
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