

Frosted Jones Pyrex Tubes

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Purpose: To describe the use of a new, frosted Jones Pyrex tube in the treatment of obstructed canaliculi of the upper lacrimal system. The frosted Jones tube retains the advantages of the traditional smooth Pyrex tube yet appears to improve the positional stability in the surgically created fistula.

Methods: Ten patients of a single surgeon who had previously undergone external conjunctivodacryocystorhinostomy and placement of a Jones Pyrex tube, with subsequent Pyrex tube extrusion, were included in the study. All had previous success with Pyrex tubes, with follow-up ranging from 1 month to 14 years. In each case, when the patient presented with an extruded tube, it was replaced with a frosted Jones tube (Weiss Scientific Glass Blowing Company, Portland, OR, U.S.A.).

Results: In this preliminary study, none of the 10 patients fitted with a frosted Jones Pyrex tube had a recurrence of extrusion. All patients reported proper functioning of the tubes, with no complaints of epiphora or discomfort.

Conclusions: Compared with a standard Jones Pyrex tube, a frosted tube functions equally well and reduces the possibility of extrusion, which is the main complication of traditional conjunctivodacryocystorhinostomy. We have exchanged smooth tubes for frosted tubes in patients who have had extrusion of the original tube, and we are currently investigating primary placement of the frosted Jones Pyrex tube.

The year was 1962, and Lester T. Jones, M.D., was hard at work. The renowned anatomist and surgeon was on a quest. Over the years, many of his patients were disabled by recalcitrant epiphora caused by factors involving the upper lacrimal system. Tears would well up in the eyes of these patients and flood down their cheeks. The patients could not read, could not drive, and could not see through the tear lake; their family and friends

would question them constantly about their emotional well-being. Dr. Jones was determined to solve his patients' chief complaint. He knew that a standard dacryocystorhinostomy that addressed the lower lacrimal system would not solve the anatomic issues that some of his patients had with the upper portion of the system, namely, floppy lower eyelids with inherent floppy canaliculi, atretic puncta unamenable to punctoplasty, or scarring of the upper system due to trauma, disease, or inflammation. Dr. Jones spent many hours in the anatomic dissection theater searching for a plausible bypass of the system. Eventually, he discovered the proper placement and angle vector for a tube to bypass the natural canalicular system. However, he had not found the proper material with which to construct this tube. He and others tried metal, Teflon, stainless steel, gold, silver, and polyethylene, which all seemed to work a little, but unsatisfactorily. After months of perspiration, Dr. Jones' son, Dick Jones, introduced the famed surgeon to his friend, Mr. Gunther Weiss, a glass blower extraordinaire.

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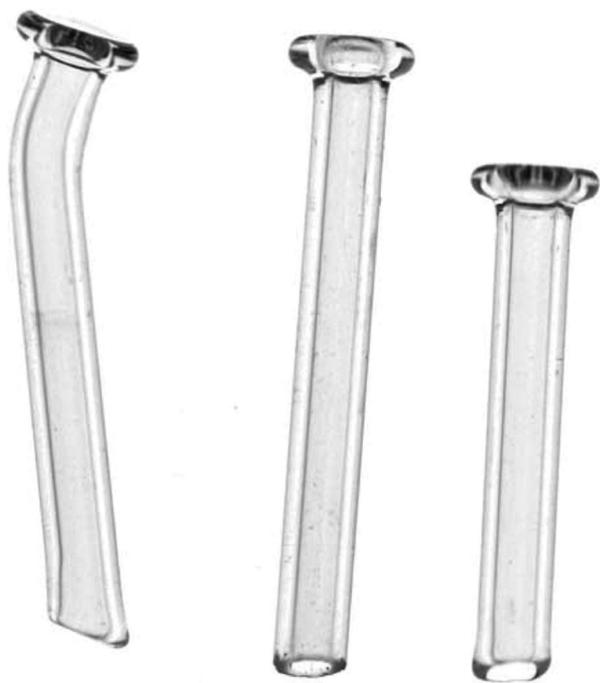


FIG. 1. Standard Jones tubes are made in various lengths and collar sizes. Angled tubes (left) help with patient anatomy. All tubes have an internal diameter of 0.8 mm and a 30° angled tip.

By chance, Mr. Weiss had some 3-mm tubing with an internal diameter of 1.5 mm that he knew had a remarkable physical property: It sucked up water! By capillary action, a tube made of glass with this internal diameter would literally move water against gravity. He demonstrated this property to Dr. Jones, who in return jumped for joy. The scientist within forced him forward. What was the ideal internal diameter to achieve the best capillary action? So, he and Mr. Weiss tested various tubes ranging from 0.5 to 2.0 mm; they found that an 0.8-mm internal diameter with a 30° angled tip “sucked the water out of the eye like a pump with no bubbles!” More than 40 years later, the Jones tube is still made by Gunter Weiss, from Pyrex tubing with an internal diameter of 0.8 mm and a 30° angled tip (Fig. 1).

The procedure of bypassing the upper lacrimal system by insertion of a Jones tube has become the standard of care.¹ Countless patients have been helped by this surgery, conjunctivodacryocystorhinostomy (CDCR) with Jones tube placement. The tube is well tolerated and remains removable for yearly debriding of mucus and the occasional need to alter the collar size or length (to hang in soft tissue suspension unobstructed mid way from the lateral wall of the nose to the nasal septum). However, for some patients, the tube is a little too free and becomes dislodged during a

sneeze or cough, or even during sleep. Extrusion rates as high as 49% have been reported.² We describe the use of a new tube that retains the advantages of the traditional smooth Pyrex tube, yet appears to improve the positional stability in the surgically created fistula.

METHODS

Patients who had previously undergone CDCR from an external approach of a single surgeon who later had extrusion of their Pyrex Jones tubes were placed in a case series. Ten patients were followed. All had previous success with Pyrex Jones tubes, with follow-up ranging from 1 month to 14 years. All presented with a tube that had “fallen out” and requested replacement. The Frosted Pyrex Jones tube (Weiss Scientific Glass Blowing Company, Portland, OR, U.S.A.) was used as the replacement.

After undergoing primary CDCR, each patient is instructed to make an office visit as soon as possible if the Jones tube became dislodged. Then, in the examination room, the patient is placed in a seated position. Topical anesthesia is administered by one drop (proparacaine eye drops; proparacaine hydrochloride ophthalmic solution 0.5%, Bausch & Lomb Pharmaceuticals, Inc., Tampa, FL, U.S.A.). The conjunctival/nasal mucosa fistula tract is probed and dilated with a Jones gold dilator. Further topical anesthesia is given as necessary. The dilator is removed, and a frosted Jones tube inserted in the fistula tract over a Bowman probe that is subsequently removed. Proper fitting includes a collar of reasonable diameter to sit well without migrating in the tract and sufficient length to have the end of the tube suspended between the lateral wall of the nose and the nasal septum as viewed up the nostril with a speculum.³

The insertion of the frosted Jones tube is no different than that of the traditional smooth Jones tube. Similarly, the removal for fitting and/or cleaning is identical. The frosted Jones tube preserves the ease of manual removal for the clinician while providing some friction to reduce the incidence of spontaneous extrusion (Figs. 2 and 3, A, B).

RESULTS

We have successfully treated 10 patients with frosted Jones tubes over the last 8 months. We find that insertion is the same as with the smooth tubes, and extraction for fitting proper lengths is not complicated by the frosting. Of the 10 patients with the frosted Jones Pyrex tubes, none have had a recurrence of spontaneous extrusion. All have reported proper functioning of the tubes, with no complaints of epiphora or discomfort. As a preliminary study, our follow-up is currently limited to 8 months.



FIG. 2. Frosted Jones Pyrex tube, with a collar and angled tip.

Conjunctivodacryocystorhinostomy with the insertion of a Jones tube remains the standard of care for canalicular obstruction. Various means of performing a CDCR have been adequately described in the literature.⁴⁻⁷ Although a vast majority of patients are satisfied by obtaining a dry, comfortable eye, extrusion remains the chief long-term complication,² with extrusion rates as high as 18% to 49%.^{2,8} Through collaboration with the original inventor, Mr. Gunther Weiss, we have found that the addition of the frosted coating to the outer surface retains all the benefits of the original tube with the added improvement of a decrease in extrusion rates. The capillary action is preserved by both the internal diameter and material of the Pyrex glass. The inert material remains well accepted by the body. And, most importantly, the frosted coating fixes the tube more securely in place (by simple friction) while still allowing easy manual removal for fittings and cleanings. Fibrovascular ingrowth in the coating does not appear to be necessary to obtain positional stability.

DISCUSSION

We recognize the short duration of the follow-up period in this study. We look forward to providing additional evidence in the future regarding long-term success of this new tube.

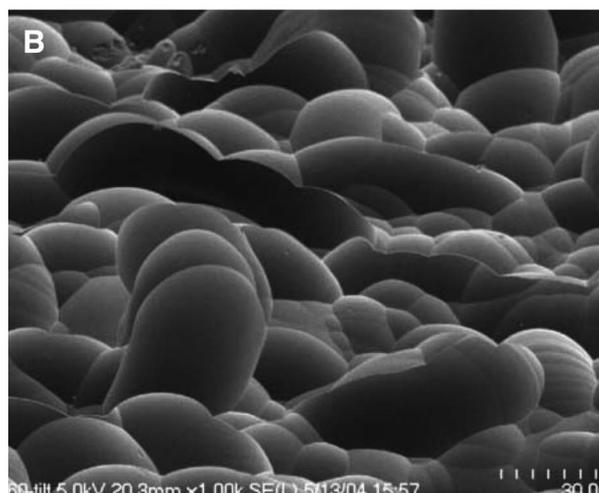
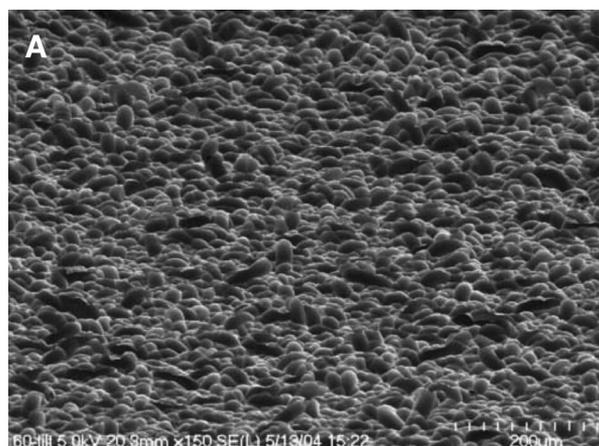


FIG. 3. A and B, Electron micrographs of the frosted coating on the Jones Pyrex tube.

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