Integra®
Use of TenoGlide® Tendon Protector Sheet to Protect the Peroneal Brevis Tendon in the Foot

CASE STUDY
Use of Integra® TenoGlide® Tendon Protector Sheet to Protect the Peroneal Brevis Tendon in the Foot

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Introduction:

Tendons need to move. Scar formation after tendon repair can limit motion and recovery. In many areas, the small amount of soft tissue between the repaired tendon and the skin can also lead to subcutaneous binding, as well as more severe complications such as wound dehiscence. The TenoGlide® Tendon Protector Sheet (a porous matrix of type 1 collagen and glycosaminoglycan) was developed to minimize some of these issues and provide a surface for tendon gliding after surgery.

INDICATIONS — TenoGlide Tendon Protector Sheet is indicated for the management and protection of tendon injuries in which there has been no substantial loss of tendon tissue.

CONTRAINDICATIONS — TenoGlide Tendon Protector Sheet is contraindicated for patients with a known history of hypersensitivity to bovine derived or chondroitin materials. It is not indicated to replace or repair damaged tendon or to reinforce the strength of any tendon repair.
Bovine collagen offers tremendous benefits compared with prior xenograft experience. Since the actual collagen DNA molecular structure is apparently well-preserved between species, the critical issue for compatibility is processing of the biologic material to alleviate immunoreactivity. The science behind Integra LifeSciences’ treatment of bovine collagen adequately demonstrates minimal-to-no allogenicity of the collagen material; this has been my clinical experience over the past 5 years as well. The time to resorption or bioincorporation of the collagen depends upon the individual material density, thickness, and the environmental milieu. Most estimates peg the duration of TenoGlide Tendon Protector Sheet at less than a few months. The ongoing clinical experience of Integra LifeSciences’ bovine products, (Integra® Matrix Wound Dressing, NeuraWrap™ Nerve Protector, NeuraGen® Nerve Guide, and TenoGlide® Tendon Protector Sheet, etc.) which now has over 10M collagen implants placed, helps to further provide the surgeon with security of experience regarding immunologic issues in hand surgery, foot and ankle surgery, neurosurgery, and plastic surgery.

The need for TenoGlide Tendon Protector Sheet after tendon repair depends upon the soft tissue envelope and reconstruction. The most important usage will probably still be in upper extremity reconstruction; I have found great application in the foot and ankle arena as well. A standard acute Achilles tendon repair engenders little risk and probably would rarely merit TenoGlide Tendon Protector Sheet; however, incorporation of a protective sliding sleeve for a revision chronic Achilles tendon tear with scarring has proven ideal. A simple tenosynovectomy of the peroneus brevis usually does well while an allograft reconstruction might benefit from early mobilization protection. The TenoGlide Tendon Protector Sheet can be applied within a tendon sheath or, even more urgently, when no such sheath exists. The concept behind the TenoGlide Tendon Protector Sheet is to provide an early tendon sheath to allow easy motion as well as a protective barrier from the subcutaneous tissues. A case study helps demonstrate my current approach using TenoGlide Tendon Protector Sheet.
Patient Profile:

Mr. M. was a 47 year old healthy male with a 12-month history of progressive lateral foot pain exacerbated with activity. Previously an active runner, he switched to the gym and exercise bicycle due to worsening foot pain. His review of systems was unremarkable. On exam he had 3/5 strength of the peroneus brevis, point tenderness at the brevis in the inframalleolar region, and pain on resistance of the peroneals. He walked with a seemingly normal gait but showed antalgia with increasing speed. Radiographs were normal but the magnetic resonance image showed increased signal in the peroneus brevis tendon with a partial tear. He felt better in a walker boot but opted for surgery after persistence of symptoms.
Surgical Procedure:

The foot is best approached from a lateral position with the patient on a bean bag for tilt. I prefer local anesthesia with intravenous sedation for most patients. The incision follows the line of the peroneus brevis in the inframalleolar region; the dissection must respect the sural nerve. The retinaculum around the distal fibula should be preserved to avoid tendon subluxation. I found significant tenosynovitis and then a complex tear of the peroneus brevis tendon with a 90% disruption and the remaining tendon stretched out and dysfunctional. The surrounding fascia was scarred down to the tendon. The peroneus longus appeared relatively normal. Repair of the brevis was not possible; either harvest and transfer of the longus or an allograft was needed to restore continuity. Luckily, the proximal brevis tendon and muscle appeared viable and mobile.

According to preoperative discussion, I then proceeded to a semitendinosis allograft procedure. I resected all but the distal 2cm of the peroneal tendon and drilled a hole in the base of the 5th metatarsal. I then placed a suture anchor in the cancellous bone through the hole and secured the end of a narrowed semitendinosis tendon to the bone, also attaching it to the distal remnant of the brevis [Figure 1]. I brought the tendon through the retinacular tunnel around the fibula and weaved it into the proximal peroneus brevis muscle and tendon well above the tip of the fibula [Figure 2].
Because the tendon sheath distally was virtually nonexistent, I wanted a barrier between the new graft and the subcutaneous tissues; this called for the TenoGlide Tendon Protector Sheet. The large square of the product can be trimmed to a suitable rectangle for encircling the new tendon. I handle it with fingers and Debakey forceps (a regular Adson has teeth which rip through the soft TenoGlide Tendon Protector Sheet). Although the product can be sewn to itself around the tendon, I have not found such action necessary and simply wrap it once around the tendon [Figure 3]. The subcutaneous tissues were reapproximated with 4-0 Vicryl and the skin with 4-0 Monocryl sutures. A well-padded Jones type splint was placed for 8 days and then Mr. M. was placed in a walker boot. He began active range of motion exercises but limited weight bearing for 4 weeks, then progressively weightbearing as tolerated. He began jogging at 3 months with an ankle stirrup brace and returned to full activity in 6 months.
Discussion:

When only one side of the tendon runs a real risk of problems, such as in the Achilles repair, I often lay a piece of TenoGlide Tendon Protector Sheet on the tendon when closing. The anterior tibial tendon can also suffer adhesive tenosynovitis and thus respond well to the use of TenoGlide Tendon Protector Sheet. Repairs of the extensor hallucis longus tendon almost always get stuck on the dorsum of the foot and warrant TenoGlide Tendon Protector Sheet consideration. The most frequent use of the material has been in the upper extremity, where the science of retaining tendon motion has been refined.

The TenoGlide Tendon Protector Sheet has very little strength and should not be confused with tendon patches or augmentation materials. This fragility makes it an excellent lubricating film without leading to the problems of more substantial and inflammatory xenograft materials. The decision to opt for TenoGlide Tendon Protector Sheet after tendon repair remains with the surgeon; perhaps longer term studies can document the excellent clinical results which I have noted over the past 3 years.

About the Author:

Stuart D. Miller, M.D. is an orthopaedic foot and ankle subspecialist in academic practice at Union Memorial Hospital, home to a fine residency program and a foot and ankle fellowship. He has a long history of innovation and is published on a number of topics. Dr. Miller is a paid consultant to Integra LifeSciences and produced this case study to facilitate further discussion on TenoGlide Tendon Protector Sheet and the merits of collagen technology.

As the manufacturer of this device, Integra does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any procedure is responsible for determining and using the appropriate techniques in each patient.
TenoGlide Tendon Protector Sheet

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**PRECAUTIONS** — TenoGlide Tendon Protector Sheet should not be applied until bleeding and infection are controlled.