Improvement Of Gliding Capacity Of Tendons

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More and better sutures and more and better rehabilitation can only carry us so far. Something must be done to alter the basic biology of tendon healing, both to speed and increase the restoration of tendon strength, and to avoid the adhesions which limit tendon gliding. In both areas, tissue engineering may hold the answer.

**Improve Strength of Repair**

Tendon strength can be improved and healing accelerated by the delivery of multipotent stem cells to the repair site[1, 2]. Delivery mechanisms that have been studied include cell seeded sutures and cell seeded tendon patches.

Strength can also be improved by the delivery of various cytokines to the repair site, again either by an interpositional patch or by adherence to sutures, whether individually, such as for TGF, Substance P or GDF5, or en masse, in the form of platelet rich plasma (PRP).

**Prevent Adhesions**

Tendon adhesions can be blocked by the use of various lubricants on the tendon surface, principally lubricin, as well as by lower profile, low friction suture designs and more physiological rehabilitation protocols.
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Ideally, these approaches could be combined, so that tendon healing is augmented by engineered cells and cytokines, while adhesions are blocked with engineered sutures and lubricants[1, 3-12].

**Tendon Reconstruction**

Tissue engineering can also be used to reconstruct tendons. Our vision is to use a tendon allograft as the scaffold- the same anatomy, shape, size and strength as the original. The graft could be decellularized, and then repopulated with host cells, aspirated from bone marrow, fat, or any other source. Cytokines of platelet rich plasma could be used to stimulate these cells, and the surface of the graft can also be customized: in the gliding portion with added lubricants to block adhesions, and at the ends with cytokines to stimulate healing. One major advantage of an allograft is that the bony insertion can eb included, thus completely sidestepping the problem of tendon to bone healing. We have had success with this concept in animal models, and anticipate that clinical trials may follow before too long[2, 6-8, 13-22].

**References**

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