13 Future trends

Scientific understanding

The scientific understanding of soft tissue conditions is increasing slowly with the aid of new methodologies and application of new technologies. More research is needed to characterize the heterogeneous cell populations now known to populate different soft tissues and to determine how these cells respond to injury. The interrelationships between aging and other factors, such as mechanical stresses, hormones, growth factors and cytokines, and cell responses to injury need to be established.

Diagnosis

Advances in imaging technologies, such as magnetic resonance imaging (MRI) and ultrasound, have already led to significant improvements in the diagnosis of soft tissue pathology, and these techniques are likely to become more sensitive, affordable and widely used in the objective assessment of individual conditions.

In the future, early changes in protein structure and composition may be monitored by non-invasive techniques, such as nuclear MRI. Biochemical analysis of tendon protein degradation products released into the bloodstream or synovial fluid, has allowed their investigation as potential markers for early tendon damage in horses, and a similar approach may be possible in human tendinopathies.

Future management and treatment

Increasingly, it is recognized that there is a lack of evidence of benefit for many of the regimens commonly used in the management of soft tissue disorders. This is not necessarily because these approaches are ineffective, but research in the field is often poorly designed and results have added to confusion rather than contributing to improved patient care. Nevertheless, it is likely that such approaches will continue to be used until evidence for their effectiveness, or otherwise, is produced, or superior treatments are developed.

Based on the premise that much soft tissue pathology represents a failure to repair tissue adequately after injury, future treatment strategies may be targeted at improving the wound-healing response in these tissues.

There have been major advances in our understanding of wound healing in skin. If generally applicable to soft tissues such as tendons and ligaments, these advances may result in new therapies. For example, growth factors such as transforming growth factor-β, designed to promote regeneration of the tendon matrix structure and composition, may be useful. An alternative strategy that may prove useful in the future involves gene therapy in tendon and ligament injuries.

When tissues are extensively damaged, such as in cruciate ligament rupture, there is currently no better option than to reconstruct the ligament, frequently using the central portion of the patient's own patellar tendon. The science of 'tissue engineering' is likely to have a major impact on the reconstruction of soft tissues. Methods are being developed to create whole tissues in culture that replicate the structure and composition of the original tissue. Cartilage, skin, ligaments and tendons have all been constructed from stem cells and supporting three-dimensional matrices, and in the future it may be possible to surgically transplant artificially grown ligaments and tendons into patients.

Fast Facts

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Declaration of Independence
This book is as balanced and as practical as we can make it.
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