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Changes in articular cartilage after meniscectomy and meniscus replacement using a biodegradable porous polymer implant

Gerjon Hannink · Tony G. van Tienen ·
Arend Jan Schouten · Pieter Buma

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Dear editors,

We would like to thank Dr. Beaufils for his interest in our work. Dr. Beaufils wonders whether the model used in our study is relevant to clinical practice, and he appears to be worried that our study might cause readers to abandon the use of biodegradable synthetic implants for partial meniscus replacement in clinical practice.

It was not the purpose of our study to attack or defend the use of synthetic meniscus replacements for partial meniscus replacement as currently employed in clinical practice, but rather to provide insight into the progression of cartilage degeneration involved with the use of synthetic materials with initially insufficient mechanical and/or chondroprotective properties for total meniscus replacement.

Our study was a continuation of previous work in which articular cartilage degeneration after total meniscectomy was compared to that after implantation of a porous polymer meniscus in dogs after 3 and 6 months [7]. At both follow-up periods, the porous polymer implant could not prevent cartilage degeneration. It was speculated that cartilage degeneration merely had taken place during the first months of implantation. During the first period after

implantation, the relatively rough prosthetic surface, not yet covered with tissue was in direct contact with the articular cartilage. However, between 3 and 6 months, the whole implant became covered with a tissue layer. In the long term, when the implant is completely infiltrated and surrounded with tissue, the functionality and mechanical properties of the construct improve, and as a consequence, the progression of the cartilage degeneration might end. Therefore, the aim of our present study was to evaluate the long-term effects of implantation of a polymer implant for total meniscus replacement compared to those of total meniscectomy on articular cartilage degeneration [2].

We are aware that our experimental model does not correspond to current clinical practice. In current clinical practice, the outer rim of the meniscus is left in situ when a partial meniscus replacement using synthetic materials is performed [3, 4, 8]. The outer rim protects the implant from overloading and will prevent the implant from being pushed into a peripheral position, resulting in almost normal contact stresses between femur and tibia. Dr. Beaufils rightly indicates that currently total meniscectomy is a contraindication for this type of meniscus replacement. It has mainly been our experimental work that provided the contraindication for the use of this type of polymer for total meniscus replacement [5, 6, 9]. However, a contraindication does not exclude further research to be performed into total meniscus replacement using synthetic materials.

Advances in clinical practice often have their roots in basic science, providing the proof of principle of the treatment concept in question [1]. This is of critical importance, especially in meniscus research, where the functional anatomy of the structure is directly related to its contribution to the complex biomechanics of the joint and its role in chondroprotection. Increased insight in cartilage damage progression, modifications to material properties,

G. Hannink (✉) · P. Buma
Orthopaedic Research Lab, Department of Orthopaedics,
Radboud University Nijmegen Medical Centre, P.O. Box 9101,
6500 HB Nijmegen, The Netherlands
e-mail: g.hannink@orthop.umcn.nl

T. G. van Tienen
ViaSana, P.O. Box 4, 5450 AA Mill, The Netherlands

A. J. Schouten
Polymer Chemistry, Faculty of Mathematics & Natural Sciences,
University of Groningen, Nijenborgh 4, 9747 AG Groningen,
The Netherlands

and changes in design might enable the use of a synthetic implant for total meniscus replacement in clinical practice in the near future.

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