

See the whole picture: knee preserving therapy needs more than surface repair

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After years of stagnation in orthopaedic surgery the advancements in cartilage research will soon lead to a real paradigm shift of diagnostics and treatment. Great progress has been made over the last decades to get cartilage repair procedures from bench to clinical practice. Instead of replacing injured cartilage using metal and polyethylene-implants it is often possible to biologically reconstruct cartilage lesions, even when several pathologies have to be addressed. The scientific basis that has been built up is unparalleled by any introduction of innovations before [5, 7, 9].

The last century was the era of invention and refinement of total and partial joint arthroplasty. These hardware implants have been impressively improved resulting in satisfactory clinical results for most of our older patients. However it is more difficult to meet the high expectations of younger patients with an “old knee” since their expectations tend to be far too high for what an artificial joint could deliver [6].

Clearly, currently here we have a problem: Over the last years an increasing number of younger patients with old knees have asked for the treatment. In a considerable percentage of these patients the knee joint is so severely damaged, that 10 years ago one would have recommended arthroplasty surgery. At that time it would have been the only reasonable treatment option to propose. With the modern biologic treatment options at our disposal new

horizons have been opened. Maybe that is why this patient-group belongs to the most challenging ones for knee surgeons aiming to avoid an early partial or total knee replacement.

For a good reason orthopaedic surgeons tend to be rather reluctant when it comes to the introduction of novel treatment methods into clinical practice. We have been trained to critically analyse the outcome of different treatment modalities not only in short- and mid-term, but also in long-term. We have learned our lesson when only small changes in before reliable implants led to devastating survival rates [4]. These bad experiences, which many of us have made over the years, led to scepticism towards new technologies. Maybe that is one of the major reasons, why most members of the orthopaedic fraternity are still hesitating to use orthobiologic treatment methods in their clinical routine. Another reason could be that after a first euphoric phase one had to realise that there remained some unsolved problems in cartilage repair. Still we are being told for years, the solution for those last problems would be just around the next corner.

There are phases in life that force us to take a step back in order to gain the full overview of a problem at hand. In the case of orthobiologic treatment of knee disorders it is important to realise that cartilage repair does nothing else than treating the surface. In some cases cartilage repair alone is able to solve a problem, but only if nothing else than the cartilage lesion was causing the symptoms of the patient [2]. In most cases a cartilage lesion is just the tip of an iceberg. When underlying pathologies were the cause of a subsequent cartilage lesion they need to be addressed in advance.

From the moment we systematically started to use the following algorithm, clinical decision-making concerning the sequence of treatment modalities was relatively easy:

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The highest priority has a balanced mechanical leg axis, followed by normal ligament laxity. Third, the amount and quality of meniscus tissue needs to be on an optimal level. These three factors form the foundation for successful cartilage repair.

For example a varus aligned leg with a cartilage lesion in the medial compartment of the knee will need a valgus osteotomy as the cornerstone of our treatment to bring the knee back into its envelope of load. An ACL-deficient knee with a lateral meniscus lesion and a subsequent cartilage lesion on the lateral femoral condyle should be stabilised [11] and the lost meniscus tissue should be substituted. In each of the named examples cartilage repair is then nothing else than the topping on a tasty ice-cream. Patients often understand the topic better, if comparisons are used, like: if a cartilage repair method alone would be applied, it would be the same as fresh paint on a rusty piece of metal. It would only work for a short period of time.

During the last years a tendency towards super-subspecialisation in orthopaedic surgery was observed. An increasing number of knee surgeons who exclusively use arthroscopic methods to treat patients with knee problems are leaving our trainings centres. If one is trained to assess knee problems mostly through the key-whole-view provided by the arthroscope, the likelihood increases that the art to consider and treat extra-articular factors as well might be in jeopardy [10].

Having understood this hierarchy of extra- and intra-articular conditions that should be checked and if necessary addressed before cartilage repair (balanced leg axis, ligamentous stability, meniscal competence), it makes us suddenly see why orthobiologic treatment often results in an “à la carte” approach. These individually tailored treatment programs obviously make it hard to include a sufficient number of patients in RCTs comparing two different types of cartilage repair products.

Besides our current growing understanding of the different types of cartilage lesions and the importance of meniscus, ligaments and alignment, we also have become aware that the patient’s potential to heal is probably the most important predictor for a successful result. This

potential is most likely determined by factors beyond our control! [1, 8].

The take home message is that in most cases it takes more than cartilage repair to bring a damaged knee back into its comfort-zone called joint homeostasis [3].

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