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EDITORIAL

… more bricks to the building of cartilage knowledge?

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This issue of the KSSTA journal contains a spicy basket of papers on cartilage repair and related problems. When I was asked to give an editorial about those papers, I used a nice sunny summer morning of one of my remaining vacation days to read them. It was a nice reading and I got new information useful for my practice. It is more than 20 years ago since our group in Gothenburg performed the first autologous chondrocyte implantation [1], the first generation ACI. Today, we have reached the third generation ACI with different scaffolds and cell-seeded carriers, but still we are only in the very beginning of knowing the secrets of cartilage and cartilage repair mechanisms. We need both experimental and clinical research contributing with bricks of knowledge of how and when to do our surgery, which lesions that need to be treated and traumatic versus osteoarthritis lesions and their different behaviours.

William Mayo once said [2], "reading papers is not the purpose of showing how much we know and what we are doing but it is an opportunity to learn". I fully agree and those cartilage papers in this edition of the KSSTA journal are such good examples of a possible new learning. It does not say that what has been found is the final truth, but as always with critical reading, found information gives us the power to change our treatment habits a bit, stimulate us to new research etc.

The papers in this edition can be divided into several categories, experimental studies, retrospective and prospective studies, review papers and single case stories. Unfortunately, no randomised clinical papers were included, but I will give you some thoughts on the ones with interest.

Many centres are working on different types of cell-seeded constructs for cartilage repair. There are also many papers on how to imitate osteochondral plugs for mosaicplasty. On the clinical market, one may use the synthetic TruFit® plug [3] by Smith and Nephew. For small-to medium-sized lesions, those plugs can be used in an open or arthroscopic setting. However, the problems start when to treat large defects with irregular surrounding cartilage and the risk of developing a mismatch in the osteochondral junction. Haasper et al. [4] use human bone marrow cells in a 3-D collagen I-bone hybrid matrix testing perfusion and cyclic compression of the grafts to induce a good quality repair tissue. As the authors use an in vitro model with perfusion and cyclic compression, it is very difficult to know how much of the findings they get that can be transferred to the real clinical situation. I suggest that these authors continue with an animal study with the same material quite fast. Too often, we see in vitro studies presented to us with promising findings, but they are not followed by more preclinical studies and the final clinical verdict.

The same accounts for the paper by Candrian et al. [5] about their use of a demineralised bone blocks covered with cell-seeded Hyalograft meshes used in a cadaver model. Their idea is good as Hyaff-11 has been used clinical in patients for some years with promising results [6, 7] but still an osteochondral technique is lacking. The paper is focused on the implantation technique, but the way the authors use the demineralised bone for the support of the Hyaff-11 is interesting. Maybe that one could see a randomised study comparing the two presented osteochondral techniques in the future? A way of inducing

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international collaboration via the platform that a journal like the KSSTA journal is acting.

Kon et al. have worked for some years with Hyaff-11 from experimental to clinical status [6, 7]. Now, the Rizzoli group has started to test a new concept for cartilage repair with an interesting material [8]. The material, which is a nano-composite multilayered biomaterial for cell ingrowth has been tested in animal models. Normally, the next step is a small pilot study followed by a randomised study. Here, the authors present one patient treated by this new composite as a case study. Their scaffold has a porous 3D trilayer composite structure mimicking the osteochondral junction. The scaffold is like a sheet which means that it could cover large areas and easily follow the initial bony contour. For me, such a scaffold is preferable to plugs that must be used as multiple plugs to cover large defects. In this case study, an optional unloading osteotomy was done at the same time which makes it difficult to evaluate the symptom-relieving effect of the scaffold itself. However, the principle of this scaffold is of interest for future one-step surgeries.

Like the gardeners' use of good quality seed for a nice garden, the paper by Pietschmann et al. [9] tells us that using the biological treatments warrants us to know more of what we are seeding. A cell can behave in many different ways and the origin of the cell as well as the state, healthy young, degenerative and old cells behave differently. My own recent experience is that even if we use high quality cells, we have to take in consideration that cells behave different on different scaffolding materials. The behaviour appears to be individual in that sense that some patient's cells do not attach and grow on certain materials. Pietschmann et al. [9] use a biphasic collagen scaffold material called NOVOCART as a chondrocyte scaffold. They found that the cell quality at the time of operation influenced the outcome of surgery 1 year postoperatively. Today, many manufactures of cells have special quality checks of their cells to avoid such problems. However, I urge the producers also to do long-term studies with cells on their used materials. Even though the cells look good at start, the cells behaviours on different materials may result in poor result. In this paper, the authors name the cell-scaffold procedure as MACI. As there exist a reg. brand on the market called MACI® [10], the procedure may instead for all similar methods be called *scaffold guided autologous chondrocyte implantation* (*SACI*).

Moreover, we need to know more about the joints that we are to treat. Like the gardener who is depending besides his/her green fingers also of the quality of the seed and the soil, the surgeon to treat cartilage defects depend not only on the quality of the cells but also on skills of surgery, knowledge of the anatomical differences and biomechanical properties. For me, Gallo represents a famous American producer of good Californian wines [11] and Hershey a famous chocolate brand [12]. However, after a sip of the paper by Gallo from Hershey and Feeley from San Francisco [13], I will relate those names also to a nice paper on the difficulties with trochlear cartilage defects. I recommend everyone working on cartilage repair surgery to read this paper to get updated in a very easy read way. Increased knowledge of what causes patellofemoral disorders and its relationship to cartilage breakdown may restrict the surgeon to do only the necessary ones.

Many papers like the ones that are collected in the cartilage basket in this edition are papers that give us some clues for our continuous handling of diseased joints.

We all know that the most important papers are the randomised level I studies. Still in cartilage repair, there are only few such level I studies. However, do not forget that by reading all types of well-written reports, we could find important information useful for our patients. I subsequently, recommend you to carefully read the cartilage-related papers in this edition and like Ingersoll [14] once said "Reason, Observation and experience-the holy trinity of science" (Robert Ingersoll 1833-99), carefully collect the informative pieces from this edition in your memory for the benefit of our patients.

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