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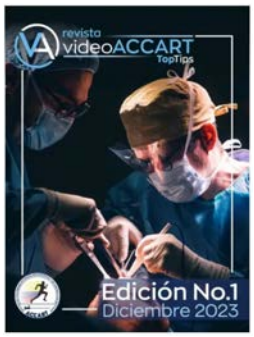

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Surgical Techniques

Meniscus Implantation and Cartilage Induction.

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KEY WORDS

Cell free collagen matrix
Meniscal Damage
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Cartilage damage
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Spongioflex
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INTRODUCTION

In most cases, a partial meniscectomy is performed after a meniscus injury. In the years that follow, a post-meniscectomy syndrome develops with secondary arthrosis. This situation then leads to a corresponding prosthetic treatment.

Various techniques for cartilage regeneration are described in the literature. These include autologous cartilage transplantation and cartilage induction with a cell-free matrix, collagen type 1, as well as various meniscus replacement techniques. In the past, the CMI implant made from bovine Achilles tendons was the market leader. However, production was discontinued in 2021. From this point onwards, only the Actifit implant was available as a partial replacement. However, unlike the CMI, this was not a biological implant but was made of polyurethane. Various studies have shown that the outcome was inferior to that of the CMI. A new biological implant has been available in Germany since November 2022 and can currently be used by 4 doctors in Germany. This is a cadaveric cancellous bone block that is demineralized and free of DNA. The implant is supplied sterile and dry. Studies on a combination of cartilage regeneration in connection with meniscus implantation are currently not available.

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DESCRIPTION OF THE TECHNIQUE

The patient must have a maximum malalignment of varus and valgus of 5°. Other contraindications include joint stiffness, chronic joint inflammation such as rheumatism, psoriatic arthritis, and arthritis urica. Allergies to bovine proteins are also a contraindication.
Sufficient patient compliance is also important, as the success of the operation depends to a large extent on adherence to the postoperative regimen.

So far, I have treated patients up to a maximum age of 65 years with this procedure. However, concomitant illnesses in particular must be considered here. Patients who must take cortisone or anti-rheumatic drugs regularly have been rejected by me.

It is also important to make the correct diagnosis using imaging, which is only possible with the help of an MRI. If there are bone changes in the sense of bone oedema, appropriate relief should be provided using an orthosis and focused shock wave therapy. The frequency of application depends on the size of the area. On average, I carry out 4 applications at intervals of 1 week. A control MRI is carried out 6 weeks after the last shock wave therapy.

The size of the cartilage defect and the edge of the meniscus must also be determined. The geometry of the cartilage defect is important. Cartilage induction is possible if the defect is up to 1.5cm wide. The length then plays no further role. Based on our postoperative scheme, the treatment of kissing lesions is also possible.

The residual meniscus should have a rim of 3mm and intact fixation of the anterior and posterior horn.

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If this information cannot be determined by MRI, I perform a nanoscopy under local anesthetic for planning purposes.

During the arthroscopy, the first step is to prepare the cartilage using a ring curette. The aberrate is removed using a shaver. The meniscus implant (Spongioflex) is placed in saline for approx. 15 minutes until it is soft. Using meniscus grasping forceps, the implant is inserted into the joint through a mini-open incision and fixed in place with all-inside sutures. The procedure then switches from water arthroscopy to gas arthroscopy. CO2 is used here. The sufflator is connected via a gas hose that can be connected to the arthroscopy trocar.

After the cartilage defect sites have dried, they are covered with a collagen gel.

OWN RESULTS

To date, no published follow-up results are available for this combination technique. However, as the Spongioflex implant is also a biological implant, it can be assumed that the results will be similar to those of the CMI implant. This is also confirmed by the short interviews I conducted and a histological examination. I have used a total of 21 Spongioflex implants since November 2022. There have been 2 complications caused by the patients themselves (pull-out due to a fall or incorrect loading). One implant could be implanted again. The second implant was removed and histologically examined. This showed cell migration of cartilage cells after just 4 weeks, which supports the assumption I made above.

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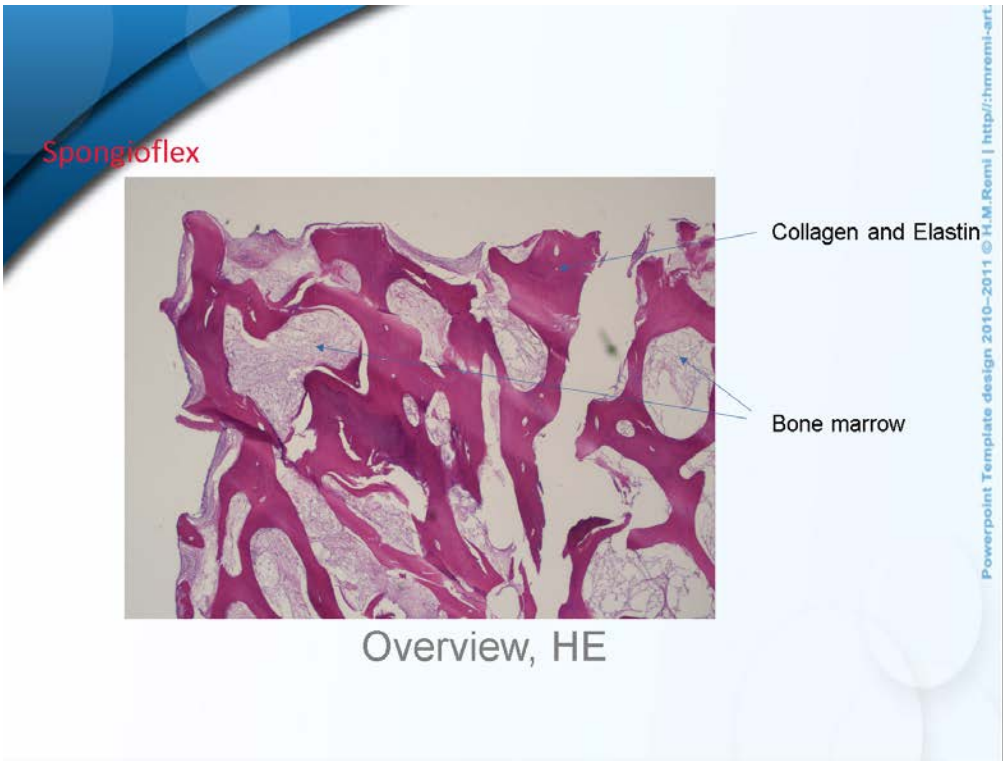

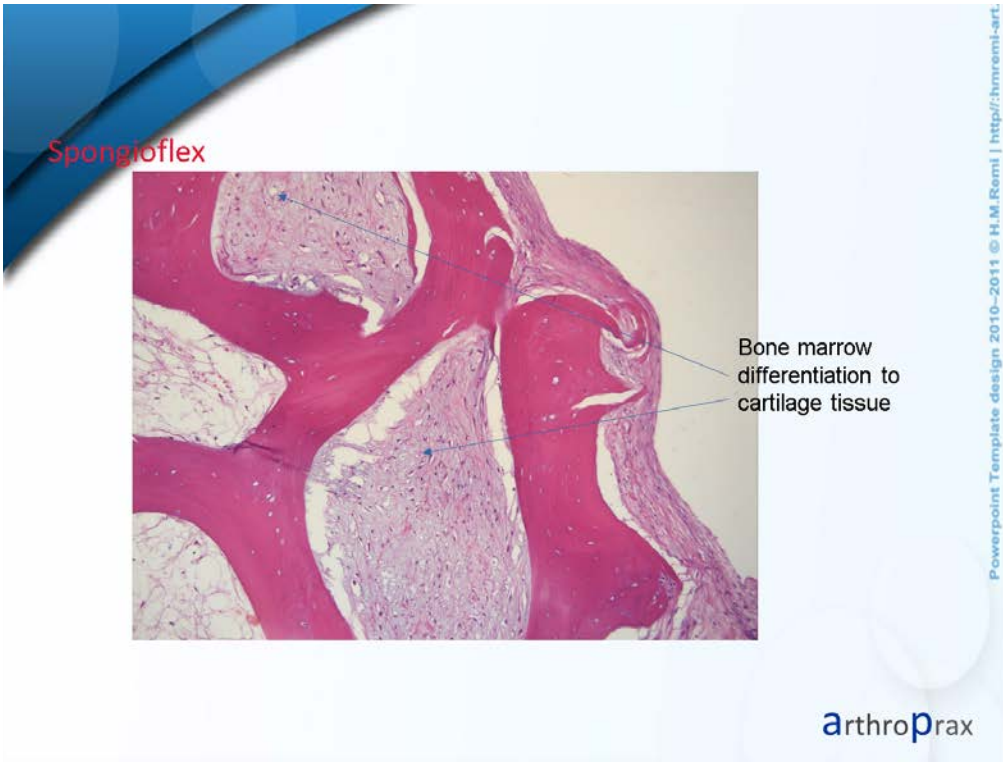

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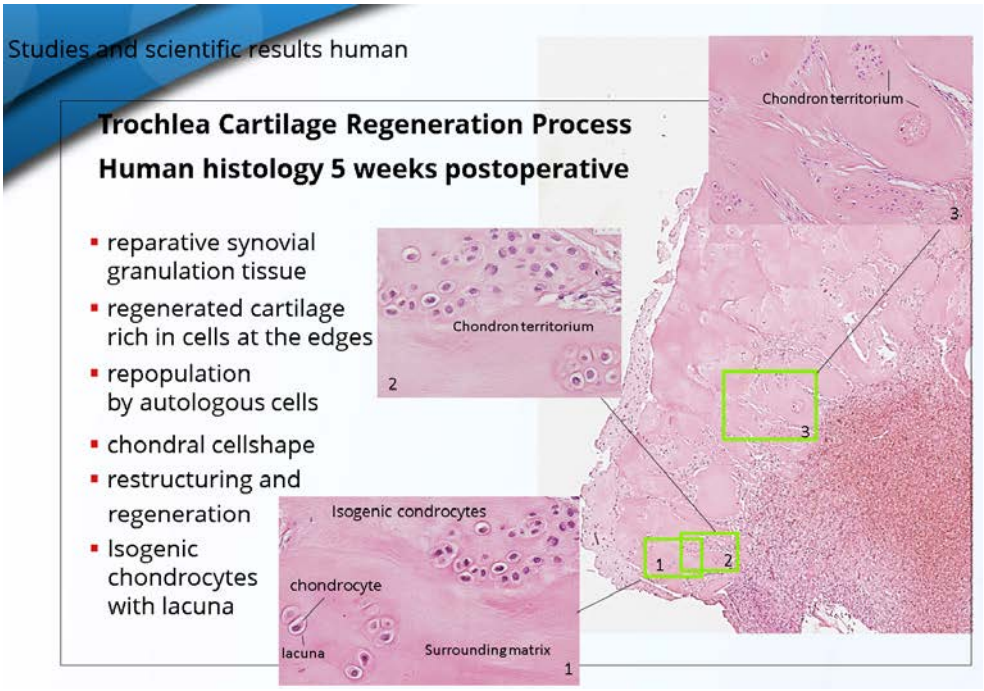
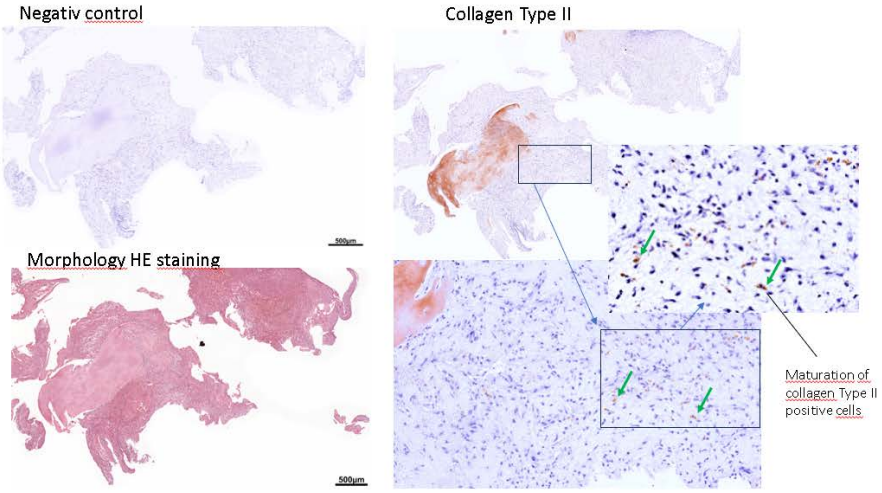
The histological section shows cartilage cell integration into the bone support tissue.

An immunohistological examination is still pending.

No further complications have occurred.





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The histological examination of a defect sample of the Chondrofiller Liquid, also after 4 weeks, showed the migration of chondrocytes and the presence of collagen in the immunohistological examination.

From 12.2018 to 05.2023, a total of 23 men and 8 women were treated with this combination technique of cartilage induction and partial meniscus implantation. These 31 patients were treated with CMI in 17 cases and with Actifit in 15 cases. One patient was treated bilaterally with CMI at 7- month intervals.

All patients had either medial or lateral meniscal damage. Simultaneous treatment of medial and lateral meniscus lesions was not performed.

The follow-up examination was performed in 11 men and 5 women with an average age of 58 years (42-69 years) using the IKDC questionnaire after an average of 24 months (3-39.5 months).

It was found that one patient treated with CMI was fitted with a full or sled prosthesis after 8 months and two patients treated with Actifit after 8 and 10 months respectively.

In the CMI group, there was an average improvement from 35.1 (25.3-37.9) to 82.3 (55.8-93.1) after IKDC and with Actifit from30.4 (21.8-54) to 73.4 (56.3-83.5).

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Complications (meniscal dislocation, allergic reactions, meniscal anchor dislocations) did not occur during the procedures. All patients underwent a standardized post-operative treatment regimen.

These results show that a combination of both biological procedures, with the correct indication, can avoid prosthesis implantation or, due to the lack of long-term studies, at least delay it.

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