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## Orthopaedics & Rheumatology



### VISCOSEAL® Roundtable Meeting

# Synovial Fluid Replacement after Arthroscopy

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# Synovial fluid replacement after arthroscopy

Arthroscopic procedures in shoulder, knee and hip are nowadays established as minimally invasive methods. However, post-operative pain, swelling and restricted mobility induced by tissue lesion cannot be completely avoided. Those post-operative symptoms can be alleviated with VISCOSEAL®, a solution of hyaluronic acid.

## Hyaluronic Acid for restoring joint homeostasis

During a roundtable meeting in January 2011 sponsored by TRB Chemedica, Dr Stefan Egger, rheumatologist, Malcherhof Hospital, Baden, Austria, portrayed hyaluronic acid (HA) as a disaccharide derivative having a high water binding ability. In addition to lubricating joints and absorbing shocks, HA exerts many other important effects. Due to its mesh like structure, it is able to bind water and consequently it acts as a shock absorber in the joint and as a nutrient transporter for the chondrocytes. Furthermore, HA exerts less known receptor-mediated effects: for example, it has an anti-inflammatory action by influencing leukocyte migration. It also normalises cartilage metabolism, stimulates endogenous HA synthesis and the production of type II collagen, and relieves pain. Lastly, owing to its filtering properties, HA prevents the spread of inflammatory and pain mediators, as well as catabolic enzymes.

## Clinical advantages with VISCOSEAL®

Dr Muthu Jeyam MBBS, FRCS, M. Phil, a shoulder and elbow arthroscopy specialist from Manchester, UK, spoke of his personal experience with VISCOSEAL®.



S. Egger, Baden



M. Jeyam, Manchester



C. Erggelet, Zurich



W. Weissenbacher, St. Veit

He has been using the product on a regular basis post-operatively since 2005 for an average of 400 to 450 shoulder arthroscopies per year.

VISCOSEAL® is a 0.5% isotonic solution of HA produced by fermentation and supplied in a 10 ml mono-use container. It can be used as a synovial fluid replacement following arthroscopy, to relieve pain and restore the physiological environment of the joint.

Although arthroscopic procedures are now more frequently performed and provide clear advantage in terms of pain reduction, faster recovery and shorter periods

of hospitalisation, Dr Jeyam pointed out that the protective constituents of synovial fluid, such as HA, are flushed out of the joint during arthroscopy. The surgical procedure itself has unfavourable effects on cartilage metabolism and results in increased breakdown of collagen and proteoglycans [Taskiran et al. 1998].

## Scientific studies

In addition to studies on knee arthroscopy that confirmed the pain-relieving effects of VISCOSEAL® [Anand et al. 2006, Mathies 2006, Villamor et al. 2004], Dr Jeyam mentioned two clinical studies concerning shoulder surgery. In 2007, a direct comparison of VISCOSEAL® with diamorphine showed that the patients from the VISCOSEAL®

group could be discharged earlier and had fewer side effects while the effect on their pain was comparable with that of diamorphine [Cohen et al. 2007]. The advantages of VISCOSEAL® were recorded in a second prospective blind study in 58 patients, who were either randomly treated with VISCOSEAL® or with a local anaesthetic following arthroscopic subacromial decompression [Funk, Wykes 2004].

Treatment group received 10 ml of VISCOSEAL® and 10 ml of 0.5% bupivacaine, while control group received 20 ml of 0.5% bupivacaine only. Pain,

## memo

## Patients who receive VISCOSEAL® ...

- are discharged earlier from hospital
- experience less post-operative pain
- need fewer analgesics
- are more satisfied
- have better Constant-Murley scores (shoulder)
- have reduced bursitis (shoulder)

with osteoarthritis of the knee. Dr Weissenbacher highlighted in particular faster mobility as an important advantage from the point of view of trauma surgery.

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duration of hospitalisation and the need for analgesics were analysed as short-term parameters, as well as the Constant-Murley score and patient satisfaction as a medium-term data. The period of hospitalisation was significantly shortened in the VISCOSEAL® group with  $5.2 \pm 13$  hours against  $9.6 \pm 5.3$  hours in the control group ( $p=0.0001$ ).

Regarding post-operative pain after 4 hours, all the pain-free patients were in the VISCOSEAL® group, whereas those recorded with severe pain were predominantly in the control group. This was also shown in the need for opiates: patients who required no opiates were exclusively observed in the VISCOSEAL® group. Follow-up data reported by Dr Jeyam showed a mean improvement in patient satisfaction that was significantly higher in the VISCOSEAL® group (58%) than in the control group (37%) (Table 1).

### Joint specific needs

Prof. Christoph Ergelet, cartilage expert in Zurich, Switzerland, listed many factors that can impair the joint environment during restorative surgery. They include breakdown products of intra-articular allograft implants, sutures and matrix components, such as those used in chondrocyte transplantation, as well as growth factors. The innovative surgical techniques increase the requirements to restore the joint environment. The irrigating solution used during arthroscopy eliminates breakdown products, but Ringer solution itself has a negative effect on the cartilage and HA is washed out. This disturbance to the joint environment can

cause recurring swelling and pain after the knee surgery.

It could be shown that with post-operative administration of VISCOSEAL®, there was a clear reduction in pain after 4 and 6 weeks [Anand et al. 2006, Villamor et al. 2004]. In addition, pain on walking and patient self-evaluated condition also improved after one and two years [Hempfling 2007].

Prof. Ergelet was also able to show that following scaffold-augmented microfractures, the cell vitality markers could be optimised, as well as the cell ingrowth into the matrix, after addition of HA. The Cochrane Review [Bellamy et al. 2006] was cited as supporting the use of intra-articular HA for the treatment of osteoarthritis with an efficacy superior to placebo and comparable to NSAIDs, with better safety.

Prof. Ergelet recommended that the arthroscopic irrigating fluid should be aspirated as much as possible after insertion of the Redon drain. Then VISCOSEAL® and subsequently NaCl solution should be instilled via the Redon drain, which should be blocked for 20 minutes post-operatively. So far no side effects have been observed.

### Post-arthroscopy treatment on 50 patients

Dr Werner Weissenbacher, St. Veit, Austria, reported his experience in the follow-up of 50 patients with meniscus lesions or osteoarthritis, who underwent an arthroscopy. Twenty-two men and twenty-eight women were differentiated into three groups : those with meniscus damage, those with a combination of osteoarthritis and meniscus lesion and those with osteoarthritis only. Twenty patients received standard treatment, while thirty patients received VISCOSEAL® post-operatively. The trauma surgeon noted that the use of VISCOSEAL® accounted for a less impairment of flexion on the first day after arthroscopy and for a faster recovery. In addition, a marked decrease in pain was observed at one day post-arthroscopy when VISCOSEAL® was used. The improved effect on pain was observed until the 28<sup>th</sup> day post-operatively. This effect was noted both for the group with meniscus damage and for the group

### Medium-term results

	VISCOSEAL® group	Control group
Number of patients	17	14
Age	50.5 (24-74)	48.9 (31-80)
Follow-up (weeks)	11.4	17.4
Change in Constant-Murley score	35.4	28.9
Change in VAS	1.3	1.2
Patient satisfaction	58%	37%

Table 1: Shoulder arthroscopy patients : follow-up data  
Personal communication from Dr Jeyam



## What is Viscoseal?

VISCOSEAL® is used to relieve pain and restore joint function after arthroscopy procedures or joint lavage.

## Composition

VISCOSEAL® is an isotonic solution (pH 7.3) of sodium hyaluronate, for replacing synovial fluid. The concentration of hyaluronic acid is 0.5% and is consequently comparable with the concentration in the synovial fluid.

## Produced from fermentation

Hyaluronic acid in VISCOSEAL® is obtained by bacterial fermentation.

## Sterility

VISCOSEAL® undergoes terminal sterilisation in an autoclave and is sealed into a sterile sachet for easy use in the operating theatre.



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