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Introduction

Geistlich Surgery, the newly formed Business Unit of Geistlich Pharma focuses on products for regenerative therapies of the human locomotor system. We are proud to provide you with the 6th issue of the Bone and Cartilage regeneration newsletter, featuring abstracts and information from the most recent scientific meetings and congresses. Cartilage Regeneration continues to gain the interest of orthopaedic surgeons around the globe.

A record number of participants from all over the world attended the 7th ICRS congress in Warsaw, Poland at the end of September. The congress provided a healthy forum to present clinical outcome results of various cartilage regeneration techniques as well as an update on the various current research activities in the field of cartilage regeneration.

Treatment of cartilage and osteochondral defects has always posed problems for orthopaedic surgeons. Conventional methods such as Abrasion arthroplasty (first described by Magnusson in 1946), Pridie drilling, microfracture, subchondral abrasion and transplantation of osteochondral cylinders (OATS) are in clinical routine use today. Lars Peterson is the pioneer of autologous chondrocyte implantation (ACI), and he and his colleagues reported good long-term results. Most recently, the use of stem-cells for cartilage regeneration has been described by different authors.

Determination of the most suitable treatment method depends on evaluating the size, depth, location of the lesion, associated injuries, and the mechanical alignment of the limb.

Conventional wisdom, as tested by Browne and Branch and Sgaglione states that small, superficial lesions, less than 2 cm, with good shoulders may not need any treatment, whereas large, shallow lesions may be best treated with autologous chondrocyte implantation. Small and medium size defects are best treated with microfracture, as demonstrated by Steadman.

The goal of the repair process is to provide a hyaline or fibrocartilage cover over the damaged chondral surface. For the last 7 years, Geistlich has been providing Chondro-Gide® collagen matrices to optimise healing in Autologous Chondrocyte Implantation and Marrow Stimulation techniques as well as bone graft to facilitate the treatment of osteochondral lesions.

One year ago, Geistlich was awarded the Swiss innovation prize for Chondro-Gide® and in December this year, the implantation of the 5000th Chondro-Gide® will be celebrated. This is the result of close co-operation between Geistlich, the clinicians and the research groups of various universities around the world. This collaboration has resulted in a well proven product which fits the requirements for most successful cartilage repair procedures. Geistlich will focus even more on the dialogue between science and industry in order to continue to develop new products. Now and in the future.

Geistlich Surgery continues to develop methods and procedures for cartilage repair together with leading surgeons in their therapeutic areas.

Geistlich Surgery
November 2007
**Posters/Abstracts Cartilage Regeneration**

**Collagen membranes for meniscal repair: In vitro and ex vivo studies**

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*Source: ICRS Electronic Poster Exhibition*

**Purpose:**
In vitro and in vivo studies were employed to investigate application of collagen membrane ChondroGide®, (CGide) for fibrocartilage tissue-guided regeneration in the treatment of avascular meniscal defects in combination with synovial membrane fibroblasts (cell-based approach) or synovial membrane (tissue-based approach).

**Methods and Materials:**
In vitro: Cells were cultured in monolayer, on CGide and in pellets in DMEM/F12 with 10% FCS or in chondrogenic serum-free media ± TGFb1. Neochondrogenesis was assessed via proteoglycan and collagen deposition (Alcian blue, Safranin O, Masson Trichrome staining) and via gene expression analysis (real-time RT-PCR for Collagens type I, II, Aggrecan and Versican). Supernatants were tested for the presence of proinflammatory cytokines. In vivo: 4mm incisions were created in 4x8 mm porcine menisci chips from the avascular zone. The implants comprised incision alone, incision with synovial membrane, incision with CGide or more stable, crosslinked VN membrane, incision with synovial membrane and CGide or VN membrane. Implants were placed subcutaneously inside four pouches in NMRI-nude mice (Ethical permission Kanton Bern, Switzerland). The explantation was performed after 8 weeks. Healing process was graded visually on sections stained with H&E and Masson Trichrome.

**Results:**
Synovial membrane fibroblasts in combination with CGide produced neofibrocartilagenous tissue upon chondrogenic stimulation with TGF 1 in vitro, and TGF 1-induced down-regulation of pro-inflammatory cytokines. Subcutaneous implantation data indicated that VN membrane combined with synovial membrane facilitated repair of meniscal incisions in 57% of cases.

**Conclusions:**
These data open the avenue to test VN membrane as an ACI-like approach for the treatment of avascular meniscal tears in pre-clinical large animal model.

**Comment:** The knee meniscus has occupied surgeons for many years, from the initial observations by Fairbank of the degenerative changes following meniscectomy in 1948 to the current biomechanical need to preserve the Meniscal function as much as possible. Different tools and techniques to repair menisci are available to the surgeon, all with varying success. Only recently have we begun to understand the healing response of Meniscal cartilage. This growing understanding has led to a number of very exciting approaches to the problem of torn and damaged menisci.

This project, in collaboration with Geistlich has shown very promising results, both in vitro and in the mouse model. It will naturally be some time before such a treatment is available to the clinic, and it is important to know that such therapies are being developed.
Treatment of articular cartilage lesions in the knee by perforations, stem cells and “autologous matrix induced chondrogenesis”: preliminary results

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Source: ICRS Electronic Poster Exhibition

Purpose:
The authors report their experience in treating articular cartilage lesions in the knee by perforations, stem cells and autologous matrix induced chondrogenesis

Methods and Materials:
From April 2006 to November 2006, 5 patients were treated with the method described in this paper using stem cells as augmentation. These were drawn from the femoral bone marrow blood through the femoral condyle.
Surgery can be performed in one step with a first arthroscopic time followed by a second open time through a mini-open incision.

Results:
All patients well accepted the method. In all cases there was the total resolution of pain between 40 to 50 days after surgery. In one of these patients it was possible to perform a second arthroscopic look with histology samples that showed the presence of hyaline cartilage.

Conclusions:
We think that this technique is reliable and sure. Our follow-up is short but yet results are encouraging: we will go on with this study so that a longer follow-up will give us more security about the benefits of this technique.

Comments: The AMIC® (Autologous Matrix Induced Chondrogenesis) technique was first performed in 2002 following in vitro and in vivo proof-of-concept testing. The AMIC technique describes the use of PAF (Partial Autologous Fibrin) Glue which acts as both a means of securely attaching the Chondro-Gide® matrix and as a chemo-attractant for the BM Stem cells released during the microfracture stage.
This group describes a modification of the original technique, based on the aspiration of BM blood and mixing this with the fibrin glue. Whilst this modification appears to stimulate more questions than it answers, the follow-up and patient numbers are too small to yield long term answers. These will need to wait until a properly controlled trial can be performed.
Mobilization after cartilage repair

Craig Garrison, USA

Source: Presentation at ICRS Rehabilitation Meeting in Zurich, June 2007

The use of mobilization after cartilage repair or stimulation techniques has been studied in both human and animal models. In normal articular cartilage, movement and compression of the joint provide nutrition and removal of wastes. If the joint is immobilized or movement is restricted, properties of the articular cartilage may become altered.\(^1\) Likewise, if movement is limited after a surgical procedure, a decrease in collagen formation can occur.\(^2\) As cyclical loading is applied to cartilage during activities of daily living or exercise, it is believed that this stimulation may help with joint repair. In the rehabilitation process, therapeutic activities such as heel slides, gradual progression of weightbearing, and stationary cycling can contribute to improved range of motion (ROM) and return to function after a surgical procedure. Additionally, manual therapy joint compression can positively influence increases in ROM of the knee.\(^3\) However, the type, frequency, and intensity of the therapeutic exercise that is required to stimulate the nutrition of the cartilage and the overall joint are not clearly defined. Continuous passive motion (CPM) after a microfracture procedure has demonstrated improvements in cartilage lesion grades in patients with full thickness chondral defects.\(^4\) The average duration for CPM use was 7.83 weeks. Improvements in articular cartilage in those patients who used CPM was significantly greater (\(P = .003\)) than no CPM when measured using second look arthroscopy. Furthermore, these improvements were the same regardless of age of the patient or where the lesion was located (patellofemoral or tibiofemoral). In cases where the patient is unable to use the CPM, they are instructed to perform heel or wall slides to facilitate flexion and extension of the knee up to 500 repetitions three times per day. Increased Type II collagen synthesis has also been seen after a microfracture when patients with full-thickness chondral defects used CPM 3 times per day.\(^5\) Immunohistochemical staining revealed the presence of Type II cartilage within the new cartilaginous tissue. In addition, it also appears that the duration and intensity of CPM use is critical for return to function.\(^6,7\) For the best results, 8 weeks of 6 to 8 hours per day at a rate of one cycle per minute has shown improved functional outcome scores. When CPM is compared to active motion after a periosteal transplantation, results show better outcomes in those patients treated with CPM.\(^8\) Overall, movement-based exercise to promote the healing of cartilage defects through stimulation of nutrition to the joint is warranted. Movements should contain some compression through the joint, but shear forces should be minimized in order to reduce the stress on the tissue. Although research has provided good clinical insights into the type and frequency of the exercises, greater investigation into the intensity needed for proper cartilage healing would be beneficial.

REFERENCES

MACI®-sandwich technique at the knee using a bilayer collagen membrane with bone graft for OCD. A case report. Preliminary results

S. Alevrogiannis, A. Triantafyllopoulos, G. Skarpas; Athens/GR

Source: ICRS Electronic Poster Exhibition

Purpose:
To present our experience in using autologous cartilage implantation with a bilayer collagen membrane and bone graft, in a young patient with a deep osteochondral lesion at his knee, due to OCD.

Material and Method:
A 25 year old gentleman was presented to our clinic with an OCD lesion of the lateral femoral condyle-trochlea area at his right knee. The lesion (Outerbridge IV), was measuring 4×3 cm² and was 12 mm in depth. He underwent a two-stage matrix-induced autologous chondrocyte implantation (MACI technique). The MACI membrane consists of a porcine type I/III collagen bilayer seeded with chondrocytes. A human allograft (Cancellous bone, ISOTIS, USA) mixed with DBM 100% (Accell, ISOTIS, USA) was used for refilling the bone defect, following subchondral bone drilling. A bilayer membrane (porcine I/III membrane, Geistlich Biomaterials, Switzerland) was placed over that with the rough side facing down, sealed with fibrin glue (Beriplast, Baxter, Vienna, Austria) and the chondral defect was covered by a MACI membrane with the chondrocytes seeded on it. This membrane was put in place using 'safety' sutures – large defect (5,0 interrupted Vicryl). The procedure was completed with a lateral release for patellar maltracking. Postoperatively, the leg was immobilized in a plaster cast for 14 days. After the removal of the sutures, he underwent a specific rehabilitation program for 3 months time. In the early phase the goal was to reduce pain and oedema, using also a CPM machine for gaining full ROM, and then to gain muscle strengthening. PWB was advised for 6 weeks, and FWB was permitted 3m.p.o, when pain and oedema were diminished.

Result:
We assessed the patient at six months post-operatively. The Tegner & Lysholm score was increased from 2 pre-op, to 6 post-op, and the visual analogue pain score was reduced from 6 pre-op to 2 post-op. The clinical outcome was excellent. No significant graft-associated complications were observed.

Conclusions:
The novel technique we used for the patient is a variation of the original Peterson ACI-sandwich technique and the one used in Royal National Orthopaedic Hospital, Stanmore in 2005. It does not require periosteal harvesting, or suturing of the graft and no harvesting for cancellous bone is needed. The procedure is therefore attractive since it may be performed faster and through a less extensive exposure. Our early results for OCD lesions, are encouraging, although further medium-term studies in more cases are required, before there is widespread adoption of the technique.
Importance of sport in cartilage regeneration after autologous chondrocyte implantation. A prospective study with a 3 year follow up

P.C. Kreuz, M. Steinwachs, C. Erggelet, C. Ossendorf, S. Krause, A. Lahm, N. Ghanem, M. Uhl; 1Freiburg/DE, 2Zurich/CH

Source: ICRS Electronic Poster Exhibition

Purpose:
There has been no data in the literature reporting the influence of sports on the outcome of autologous chondrocyte implantation (ACI) in chondral defects of the knee. Using a sports activity rating scale the present study describes the influence of different activity levels on the final outcome of ACI.

Methods:
Between 1997 and 2003, 118 patients with an average age of 36 years underwent an ACI. According to the sports activity level before start of symptoms, the patients were assigned to 2 different groups: group I with no or rare sports (1-3 times/month); group II with regular (1-3 times/week) or competitive sports (4-7 times/week). All patients underwent clinical and MRI evaluation preoperative and 6, 18 and 36 months after ACI.

Results:
In the two groups I / II, 50 / 28 defects were located on the femoral condyles, 11 / 12 on the patella and 8 / 9 on the trochlea. The preoperative activity level was in both groups grade 4. The patients of group I showed significantly better results (<0.01) in the ICRS- and Cincinnati-score as the patients of group II. Preoperative evaluation revealed no correlation between the sports activity levels and the clinical scores (p>0.05). However from the 6th month on, correlation was statistically significant and increased from 6 to 18 and from 18 to 36 months postoperative.

Conclusions:
Moderate sport during postoperative rehabilitation is an important tool for improving the final outcome after autologous chondrocyte implantation and should be performed over 2 to 3 years following a rehabilitation program.

Comments: This is one of the first studies to show a benefit from sports activities during the rehabilitation period. This is in line with e.g. the logic that activity increases the availability of nutrients and the disposal of waste products to encourage healthy cartilage tissue metabolism.

As part ongoing research into the optimal rehab scheme, it is now important to identify what types of sport, how often and at what level should be used to ensure healthy repair cartilage.
Autologous matrix-induced chondrogenesis (AMIC®): A 2-year follow-up

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Source: ICRS 2007 Congress Abstract Book

Purpose:
Autologous matrix-induced chondrogenesis (AMIC®) is a new treatment option for full-thickness cartilage defect repair (Outerbridge III to IV). It combines the well-known microfracturing technique (according to Steadman) with a porcine collagen type I/III matrix implant. A retrospective study has been carried out to investigate the objective and subjective clinical outcome of this procedure over a period of up to 2 years post-operatively. 33 patients with focal chondral defects of the knee joint were treated with AMIC. In all cases the matrix was glued into the defect. All patients were followed-up clinically with MRI, IKDC Score, Cincinnati Score (CS) and Lysholm and Gillquist Knee Score (LG). 27 patients were included into the 2-years evaluation.

Methods and Materials:
33 patients (16 female, 17 male, mean age 35 +/- 12 years) with focal chondral defects of the knee joint (14 retropatellar, 13 medial femoral condyle, 3 lateral femoral condyle, 3 trochlea) were treated with AMIC®. The average defect size was 3,6 cm² +/- 2.6 cm². The matrix was glued with partially autologous fibrin sealant to the subchondral bone. All patients were followed-up clinically with MRI, the IKDC Score, Cincinnati Score (CS) and Lysholm and Gillquist Knee Score (LG). 27 patients were included into the 2-years evaluation. In 6 patients an accompanying meniscal lesion was diagnosed. A second or third cartilage lesion was found in 8 patients.

Results:
All scores improved at 1 and 2 years post-op compared to pre-op. The IKDC score increased from 30 (+/-14) at the initial visit to 56 (+/-23) at 1 year and from 27 (+/-11) to 63 (+/-23) at 2 years after surgery.
The CS improved from 39 (+/-17) pre-operatively to 67 (+/-19%) (1 year) and from 35 (+/-15) prior AMIC® to 72 (+/-22) at 2 years. In the LG score we saw an improvement from 38 (+/-19) pre-operatively to 71 (+/-26) after 1 year and from 34 (+/-18) to 77 (+/-23) at 2 years after the procedure. We investigated MRI images of all patients. Correlation was achieved best in 9 patients who were examined in the same scanner with an adjusted MRI protocol. However the patients collective is yet to small to yield significant results. MRI images of 3 patients ranging from 2-year to 3-year follow-up are provided. Note: Patient02 has had bilateral AMIC® at different times. Individual scores at time of investigation are demonstrated in annotations.

Conclusion:
The results indicate that AMIC® is a promising alternative in the treatment of local cartilage defects in the knee with good short and mid-term results. It is presumed that this procedure is capable of healing cartilage defects of medially sizes. Further follow up will reveal, if the good results are durable and AMIC®, as matrix enhanced microfracturing technique can become a valuable, recognized cartilage repair technique.
**Autologous Matrix Induced Chondrogenesis (AMIC®) for focal chondral defects of the knee – 1-3 year results**

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*Source: ICRS 2007 Congress Abstract Book*

**Purpose:**
Microfracturing utilizes mesenchymal stem cells (MSC) for an autologous repair process. Autologous Matrix Induced Chondrogenesis (AMIC®) combines microfracturing with the application of a porcine collagen type-I/III bilayer matrix (Chondro-Gide®) to host the MSC and to stabilize the blood clot.

**Methods and Materials:**
36 focal chondral/osteochondral defects (ICRS III-IV°) in 33 patients (Ø age of 36.2 (18-52) years) were treated by standardized microfracturing and application of a Chondro-Gide® collagen matrix (Geistlich Biomaterials, Wolhusen, Switzerland). The results were evaluated prospectively by functional outcome scores, subjective clinical ratings and MRI with an average follow-up of 21 months (range 12-39 months). The mean defect size was 3.86 cm² (1.0 – 6.8 cm²). 21 patients (63.6%) had undergone at least one prior surgery.

**Results:**
All patients rated their ICRS functional status as abnormal (ICRS III° (63.4%)) or severely abnormal (ICRS IV° (36.3%)). Statistically significant improvements were seen for the Cincinnati-Score (51.1 to 85.1) as well for the Lysholm-Score (60.4 to 87.7, each p<0.001). Pain decreased significantly from 6.1 to 1.8 while subjective knee function improved from a mean of 4.6 to 7.5 on a visual 10-point scale. 4 biopsies (4-21 months) revealed reasonable results with regards to surface formation, filling and integration. The MRI follow-ups showed an adequate filling of the defect. 83% of the patients were satisfied with the functional results (ICRS I°+II°).

**Conclusions:**
AMIC® is a minimally invasive, effective treatment option for focal cartilage defects of the knee of medium or large size. Without using cultured chondrocytes it can be performed cost-effectively as a one-step procedure.

**Comments:** AMIC® (Autologous Matrix Induced Chondrogenesis) has the benefit of being based on sound science and the early results from a number of centres look extremely encouraging when used in a wide variety of patients. According to the current experience and results, AMIC® is best suited to 2-7 cm² size defects, with or without stable shoulders. It is however important to remember that at this stage only short-to-medium term results are available. All of the reported patients, including this cohort will need to be followed for much longer to be able to confirm that we have an efficient, cost-effective solution.
**AMIC® Update: Ask the expert**

**Question:**
Can I perform an ACL Reconstruction and an AMIC® procedure simultaneously?

**Answer:**
Yes, the patient can mobilize immediately post-operatively. This should consist of partial weight bearing (maximum of 20 kg) for 6 weeks. Brace in extension (0°) for 2 weeks in order to support the healing process of the tendon harvesting site and to avoid hematoma in the ACL-tunnel. Afterwards CPM for 2 weeks each 0/60°, 0/90° and 0/120°.

*Provided by:*
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**Question:**
You have shown good results with the AMIC® Method in retropatellar defects. Were these kissing lesions? Did you treat both areas at the same time?

**Answer:**
On the trochlea I use a periosteal flap and on the patella I use the Chondro-Gide® Matrix and I did both surfaces at the same time.

**Question:**
You have previously shown examples of defect filling of a large osteochondral defect on the distal femur. Did you have to wait for this defect to heal before proceeding with the AMIC® procedure?

**Answer:**
I performed both parts of the surgery at the same time. I filled the OCD defect with a mixture of autologous bone and Orthoss® bone mineral matrix (50:50). The Chondro-Gide® Matrix was then attached over this and thus serves as a scaffold for the mesenchymal stem cells and also prevents the bone from migrating in the joint space.

*Provided by:*
Prof. Dr. Roland P. Jakob
Email: jakobroland@gmx.ch
Orthoss® Update: Bone Grafting in Revision Arthroplasty

Clinical Case provided by Prof. Dr. med. Michael Wagner, Chemnitz, Germany

In most hip revision procedures, reconstruction of bone defects is indicated. Bone grafting in acetabular revisions with major bone defects is conducted, using Orthoss®, an inorganic bone mineral matrix of bovine origin. Orthoss® is chemically comparable to mineralised human bone and has proven excellent osteoconductivity. The defects are filled with bone matrix and secured using antiprotrusio cages and acetabular reconstruction rings to provide a bed for acetabular component fixation.

Patient History
Female Patient, 83 years old, 18 years after implantation of a cemented hip system.
Cup loosening and breakage on the left side.
Hip revision surgery was performed and a significant osteolysis in the acetabulum with Paprosky IIIa defect.
The cup was reconstructed using a Burch-Schneider Ring Implant (Zimmer) and approx. 60 cc of Orthoss®.

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<th>X-ray 15 months post OP</th>
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The postoperative course was uneventful in this case. No revision was necessary, no infection occurred. In the short-term follow-up, the clinical and radiological examinations showed no adverse changes; there was no resorption of the Orthoss® bone graft. No implant migration could be detected.

The inorganic bone mineral matrix Orthoss®, of bovine origin, seems to be a good substitute for human bone in total hip revision surgery. It is suitable for filling even major defects. The short-term results, mainly in cavitary defects, are promising.
The use of Orthoss® does not need any difficult preparation because it can be stored on the shelf without at room temperature.
Geistlich Partner Update

For many years, Geistlich and TiGenix have co-operated and Geistlich is TiGenix's preferred partner for the supply of Chondro-Gide® matrices for their “Characterized Chondrocyte Implantation” product, ChondroCelect.

Successful completion of ChondroCelect pivotal phase III trial
In February 2007, TiGenix announced positive Phase III results of a landmark trial comparing ChondroCelect to microfracture, which is a current standard of care for cartilage defects in the knee. This multi-centre prospective randomized controlled trial, in which a total of 118 patients have been treated, was designed to assess structural repair and improvement of clinical outcome. At 12 and 18 months, both structural and clinical primary endpoints were met, indicating that ChondroCelect has the potential to significantly increase the success rate of the cartilage regeneration process.

ChondroCelect enters registration phase
In June 2007, TiGenix submitted a Marketing Authorization Application (MAA) for ChondroCelect to the European Medicines Agency (EMEA). TiGenix expects the first feedback from the European regulators in the 4th quarter of this year and that the full approval process may be completed in the second half of 2008. Upon successful approval ChondroCelect will be the first cell therapy product for cartilage regeneration to receive central marketing authorization in all 27 EU member states as well as in Norway, Iceland and Lichtenstein. In order to prepare the European commercial launch of ChondroCelect, the Company has been expanding its sales and marketing team as well as the key opinion leader network. TiGenix is also evaluating different options to increase the cell production capacity in Europe. A decision in this respect will be made before the end of the year. TiGenix intends to file a Biologics License Application (BLA) to the US Food and Drug Administration (FDA) in 2008. Meanwhile, the required manufacturing comparability testing (between the European and US facilities) should have been performed and additional long-term (3 year) follow-up data should be available to support the clinical benefit of ChondroCelect.
Geistlich Germany: Growth through Competence

Geistlich Germany is currently the fastest growing market within Geistlich Surgery, Bone- and Cartilage Regeneration products. The strong team under the leadership of Dr. Thomas Braun (Managing Director) and Dr. Jürgen Gallas (Sales Director) consists of highly motivated and competent people with a solid scientific background and long term experience in the orthopaedic field. The team achieved a high growth rate of more than 300% over the last 2 years. With its excellent network and customer proximity, the organization managed to develop a well balanced local product portfolio of bone regeneration and cartilage regeneration. This achievement is a solid base for the future growth of Geistlich in the field of orthopaedic, trauma- and spinal surgery.

At the most recently held combined congress of the German Orthopaedic- and Trauma Surgeons, Geistlich Germany hosted two satellite symposia, one on cartilage repair and one on bone regeneration using stem cells. Geistlich Germany has identified the importance and need of stem cells in tissue regeneration and has started a clinical test series together with Harvest Technology to fill spinal fusion cages with Orthoss® and Stem Cell Concentrate in Potsdam under the lead of Dr. Karsten Ritter-Lang. The outcome of this work will drive the future success of Geistlich in Germany as well as in other countries.
**Congresses and Events 2008**

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**Review of Congresses and Events 2007**

Geistlich Biomaterials held lunch workshops at the Swiss Orthopaedic Congress in Montreux, the ICRS in Warsaw and the DGU/DGOOC Meeting in Berlin.

**ICRS Congress, Warsaw, Poland**

Prof. Behrens (l.) and Prof. Steinwachs (r.) acted as speakers and instructors during the ICRS Surgical Skills Course which was held prior to the ICRS world congress in Warsaw.
Prof. Steinwachs served as Chairman of the Geistlich Satellite Symposium on modern biological cartilage treatment methods which was held during the ICRS congress. The symposium attracted 250 participants. The participants also actively participated in the discussions.

SGO (Swiss Orthopedic Association)

The speakers and the Geistlich Team in Montreux

More than 150 orthopaedic surgeons from Switzerland attended the Symposium on New Biological Methods for Cartilage Regeneration

Links:
www.aaos.org
www.cartilage.org
www.efort.org
www.isakos.com
www.aga2007.de
www.orthopaedie-unfallchirurgie.de
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