Cartilage. 2020:1-11. DOI: 10.1177/1947603520924762

# Complex Meniscus Tears Treated with Collagen Membrane Wrapping and Bone Marrow Blood Injection Show Good Clinical Effectiveness and Survivorship after 5 Years Follow-Up

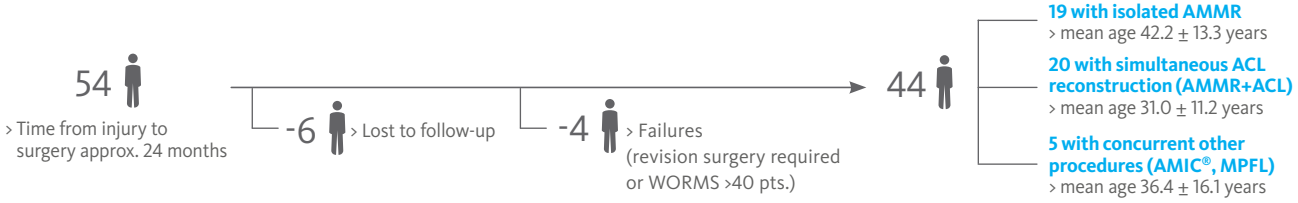
Kinga Ciemniewska-Gorzela, Paweł Bąkowski, Jakub Naczk, Roland Jakob, Tomasz Piontek

› Arthroscopic suture repair combined with Chondro-Gide® wrapping of the meniscus and bone marrow blood injection between meniscus and membrane (AMMR™) resulted in very good mid-term clinical and radiologic outcomes.
› The AMMR™ treatment enabled preservation of meniscus tissue with a favorable survival rate at 5 years and thus offered a valuable alternative to meniscectomy.

**Prospective case series (Level IV)**

**Consecutive patients from a single center**
All patients with complex, full-thickness meniscal tears (>20 mm long and reaching the avascular zone) were treated with AMMR between 2010-2011

**Available for follow-up at Ø 5.9 years**
Subgroup analysis to assess the influence of simultaneous ACL reconstruction




## Significant Improvement of Clinical, Patient-Reported, and MRI-Based Scores After AMMR

› After AMMR treatment, Lysholm (Fig. 1) and IKDC subjective scores (Fig. 2) improved significantly in both subgroups (isolated AMMR and AMMR+ACL) compared to preoperative values.

› Both subgroups improved similarly and the improvement was maintained from 24 to 60 months (Fig. 1 and 2).

› Meniscal injury resulted in clinical symptoms of pain, effusion, clicking/locking and a positive McMurray's test (high Barrett score). Fig. 3 shows significant improvement in Barrett score at 24 and 60 months follow-up (FU) for both subgroups with no clinical symptoms (i.e. very low Barrett scores).

› Degenerative changes of the knee were assessed using the Whole-Organ MRI Score (WORMS). From 24 to 60 months, WORMS of the entire cohort significantly worsened (i.e. increased) but at a low level (no osteoarthritis). This increase was due to the significantly increased WORMS of the AMMR+ACL subgroup at 60 compared to 24 months, while the isolated AMMR group remained stable over time (Fig. 4).

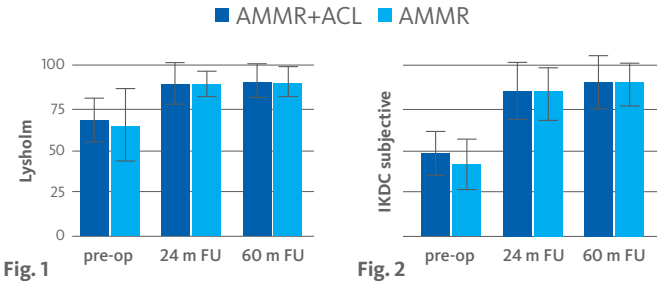



Fig. 1 Fig. 2

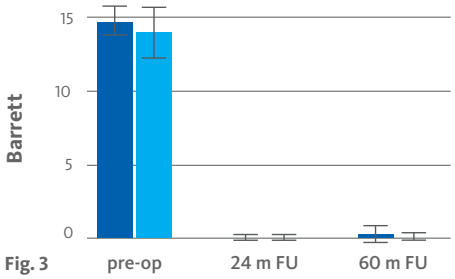



Fig. 3

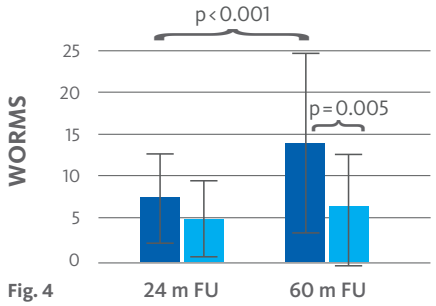



Fig. 4

Geistlich
Surgery

## CHONDRO-GIDE® LITERATURE HIGHLIGHT

The bilayer collagen membrane is an established product for cartilage therapies with 20 years of clinical use. AMIC® Chondro-Gide®, a technique that combines bone marrow stimulation with the use of a collagen membrane, has been used for over 15 years. Based on pre-clinical and clinical evidence, AMIC® was included in the treatment recommendations for cartilage lesions of the talus, knee and hip by the respective committees of the German Society for Orthopaedics and Trauma (DGOU).

Recently, the intended use of Chondro-Gide® was extended to augment meniscal repair by wrapping the membrane around the sutured meniscus. The corresponding meniscus wrapping technique is registered as AMMR™.

This literature highlight addresses important aspects of the evidence for the use of Chondro-Gide®.

› At 60 months follow-up, 98% (43/44) of the patients were satisfied and would undergo the surgery again.

› The Kaplan-Meier survival analysis demonstrated a survival of 88% at 5 years follow-up.

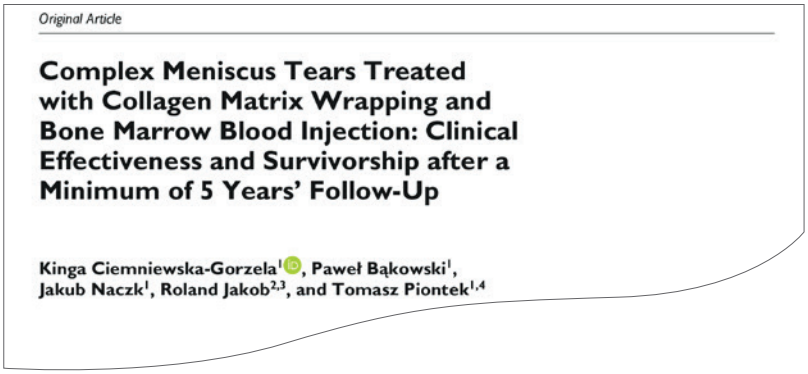
**Conclusions**

› The **AMMR** treatment evaluated in this study showed **excellent mid-term clinical, patient-reported,** and **MRI-based outcomes.** Type of meniscal tear or complexity of knee injury (isolated AMMR vs. AMMR+ACL) did not affect clinical outcomes.

› The results suggest that **AMMR halts the progression of degenerative changes** in patients with **isolated meniscal tears.** But higher WORMS detected in the AMMR+ACL subgroup indicate that simultaneous ACL injury may predispose the knee to degeneration.

› **AMMR** enabled **meniscus preservation** and presented a **valuable alternative to meniscectomy** with a favorable **survival rate** after **5 years** even in **complex and severe meniscal lesions.**

For details of the study refer to the original article:


Original Article

**Complex Meniscus Tears Treated with Collagen Matrix Wrapping and Bone Marrow Blood Injection: Clinical Effectiveness and Survivorship after a Minimum of 5 Years' Follow-Up**

Kinga Ciemniewska-Gorzela[1], Paweł Bąkowski[1], Jakub Naczk[1], Roland Jakob[2,3], and Tomasz Piontek[1,4]

› Chondro-Gide®, the original AMIC® membrane[1]
› One-step procedure for cartilage regeneration techniques[1, 2, 3]
› With more than 10 years of clinical experience[4]



1 Geistlich Pharma AG, data on file
2 Schiavone Panni, A. et al. Good clinical results with autologous matrix-induced chondrogenesis (Amic) technique in large knee chondral defects. Knee Surg Sports Traumatol 2018 Apr;26(4):1130-1136. doi: 10.1007/s00167-017-4503-0. (Clinical study)
3 Niemeyer, P, et al. Significance of Matrix-augmented Bone Marrow Stimulation for Treatment of Cartilage Defects of the Knee: A Consensus Statement of the DGOUWorking Group on Tissue Regeneration. Z Orthop Unfall 2018; 156(05): 513-532. doi: 10.1055/a-0591-6457
4 Kaiser, N., et al. Clinical results 10 years after AMIC in the knee. Swiss Med Wkly, 2015, 145 (Suppl 210), 43S. (Clinical study)



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