

# Möglichkeit und Grenzen der arthroskopischen Technik bei der Implantation von Knorpelmatrices

Angele



---

---

---

---

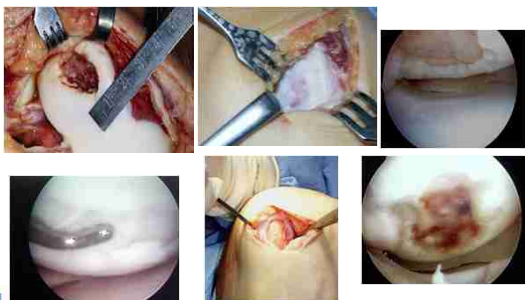
---

---

---

---

## Knorpelschaden



---

---

---

---

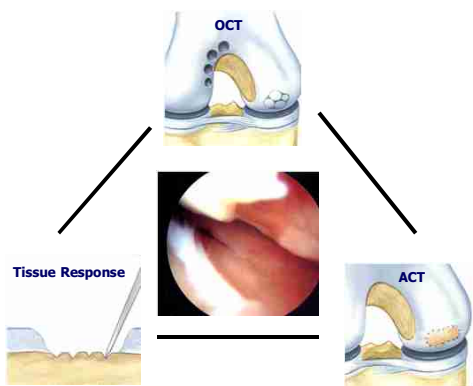
---

---

---

---

## Welches biologische Knorpelverfahren ?



---

---

---

---

---

---

---

---

### Outcome nach Mikrofrakturierung

Variable Defektfüllung  
[Mithoefer 2005; Gudas, 2009; Von Keudell, 2011; Brown, 2004]

Fibrokartilaginäres Gewebe mit reduzierter biomechanischer Belastbarkeit  
[Hunziker 2002, Johnson 2001; Gudas, 2005; Basad, 2010]

Regenerat bis 2-3 Jahre mit anschliessend signifikanter Verschlechterung des Outcomes  
[Mithoefer 2005, 2009; Kreuz, 2006; Kon, 2009; Gudas, 2009]



---

---

---

---

---

---


---

---

### Mikrofrakturierung und Biomaterial

**AMIC:** Initiale Beschwerdereduktion & funktionelle Verbesserung  
Im MRT variable Defektauffüllung & Oberflächenstruktur  
AMIC vs. MACI: bessere Ergebnisse im MRT nach MACI  
4 - Jahresergebnisse wieder schlechter  
[Benthien, 2010,2011; Dhollander, 2011; Gille, 2010]

**AMIC mit PRP:** Retropatellare Defekte, 5 Patienten  
3 von 5 Patienten intraläsionale Osteophyten  
[Dhollander, 2011]



---

---

---

---

---

---

---

---

### Arthroskopische Implantation zellfreies Biomaterial



[A.D., 11.02.68]



---

---

---

---


---

---

---

---

### Arthroskopische Implantation zellfreies Biomaterial



[A.D., 11.02.68]

**UKR** Universitätsklinikum  
Regensburg

**sportropaedicum**  
straubing berlin regensburg

---

---

---

---

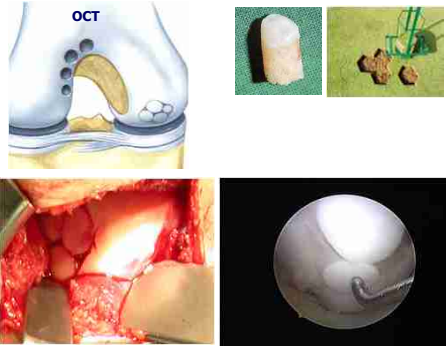
---

---

---

---

### Osteochondrale Transplantation (OCT)



**UKR** Universitätsklinikum  
Regensburg

**sportropaedicum**  
straubing berlin regensburg

---

---

---

---


---

---

---

---

### Osteochondrale Transplantation (OCT)



Z.n. OCT med. FC 1Jahr postOP  
PJ 28.11.76

Entnahmestelle OCT med Gleitlager

**UKR** Universitätsklinikum  
Regensburg

**sportropaedicum**  
straubing berlin regensburg

---

---

---

---

---

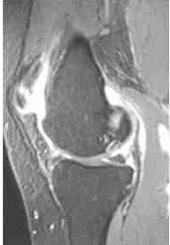
---

---

---

### Transplantation zellfreier osteochondraler Plug

Subchondrale Zysten.  
Intraläsionale Osteophyten  
Kleine OD



[WT, 311.]

---

---

---

---

---

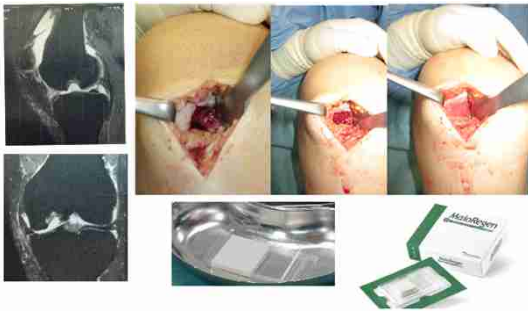
---

---

---

### Zellfreie Materialien für osteochondralen Defekt bei Degeneration

[RG, 23.06.60]



---

---

---

---

---

---

---

---

### Autologe Chondrozytentransplantation



---

---

---

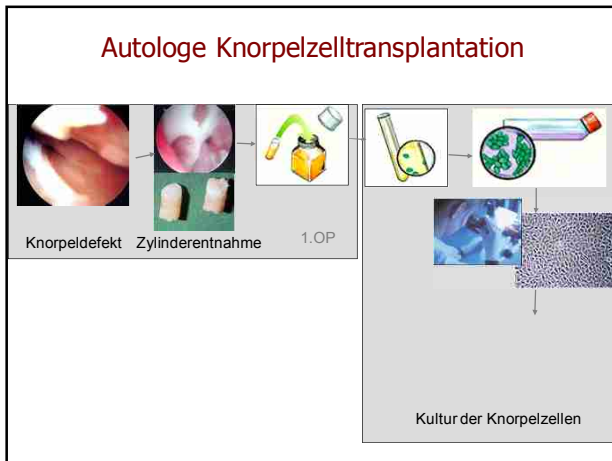
---

---

---

---

---




---

---

---

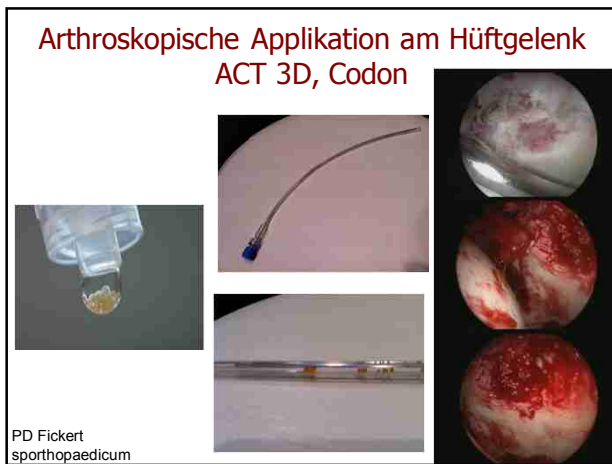
---

---

---

---

---




---

---

---

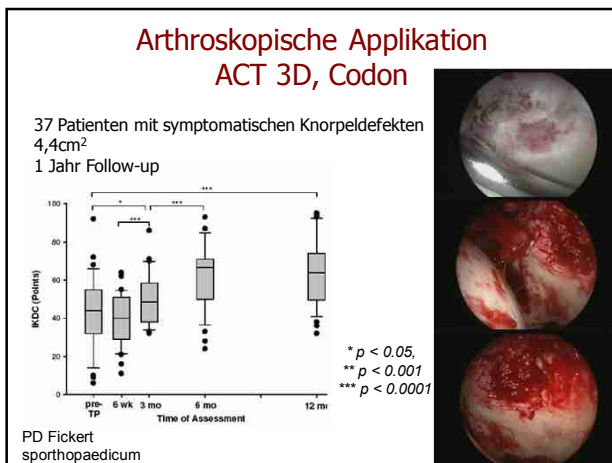
---

---

---

---

---




---

---

---

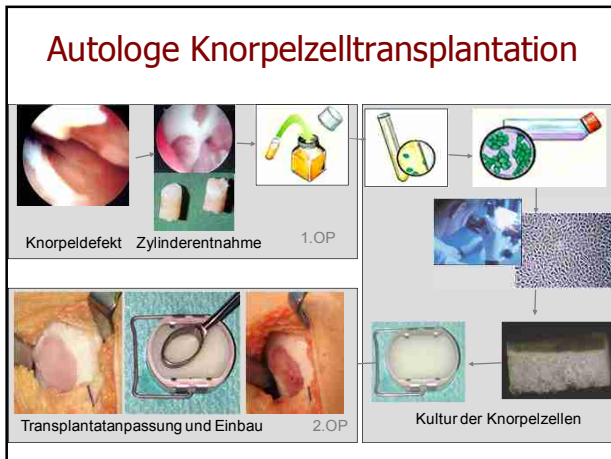
---

---

---

---

---




---

---

---

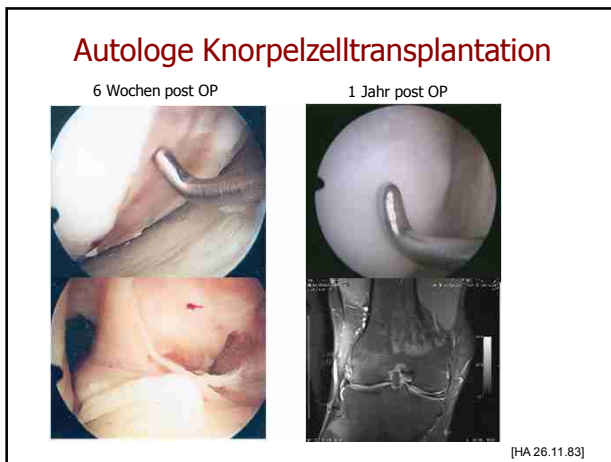
---

---

---

---

---




---

---

---

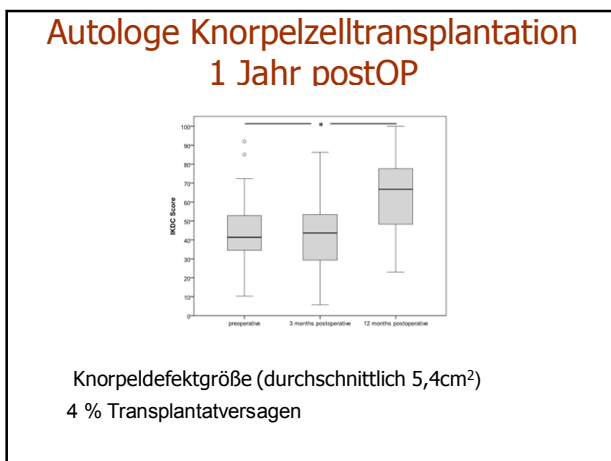
---

---

---

---

---




---

---

---

---

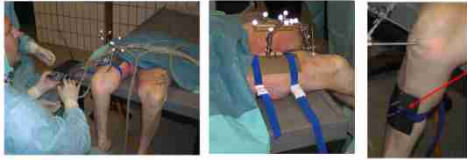
---

---

---

---

## Navigation zur Knorpeltherapie - arthroskopische MACT



[Zellner, Angele, 2012]

---

---

---

---

---

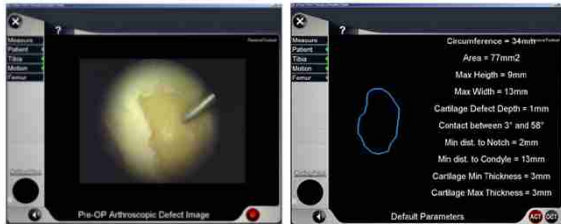
---

---

---

## Navigation zur Knorpeltherapie - arthroskopische MACT

Defektgrößenbestimmung



[Zellner, Angele, 2012]



---

---

---

---

---

---

---

---

## Navigation zur Knorpeltherapie - arthroskopische MACT



[Zellner, Angele, 2012]



---

---

---

---

---

---

---

---

### Navigation zur Knorpeltherapie - arthroskopische MACT



The image shows three panels: a surgical view of a knee joint with a navigation system, two computer monitors displaying 3D navigation data, and a close-up of a surgical instrument.

[Zellner, Angele, 2012]

UKR Universitätsklinikum Regensburg  
sorthopaedicum  
straubing berlin regensburg

---

---

---

---

---

---

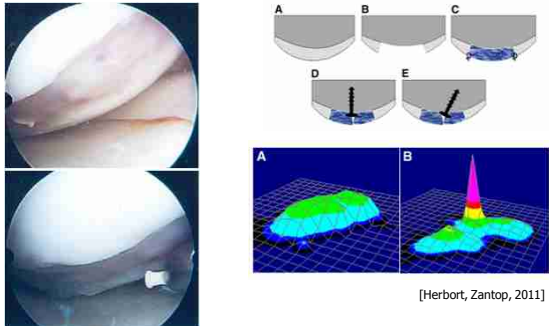
---

---

---

---

### Mögliche Probleme bei arthroskopischer MACT



The image includes two arthroscopic photos of a knee joint, five schematic diagrams (A-E) showing different stages or types of cartilage defects, and two 3D surface maps (A and B) illustrating cartilage topography.

[Herbert, Zantop, 2011]

---

---

---

---

---

---

---

---

---

---

#### Arthroscopic Second-Generation Autologous Chondrocyte Implantation : A Prospective 7-Year Follow-up Study

Giuseppe Filardo, Elizaveta Kon, Alessandro Di Martino, Francesco Iacono and Maurizio Marcacci  
*Am J Sports Med* 2011 39: 2153 originally published online July 29, 2011



The image shows four arthroscopic views of the knee joint during the ACI procedure, followed by a small inset photo of a patient's knee.

62 Pat. mit symptomatischem Knorpelschaden  
Defektgröße (2,5+/-1,0cm<sup>2</sup>)  
11% Transplantatversagen

---

---

---

---

---

---

---

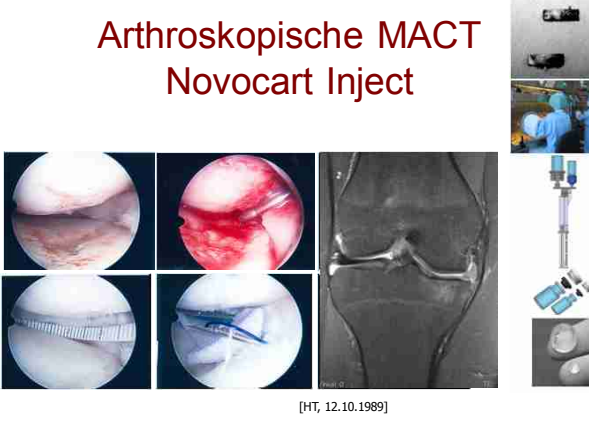
---

---

---



### Arthroskopische MACT Novocart Inject



[HT, 12.10.1989]

---

---

---

---

---

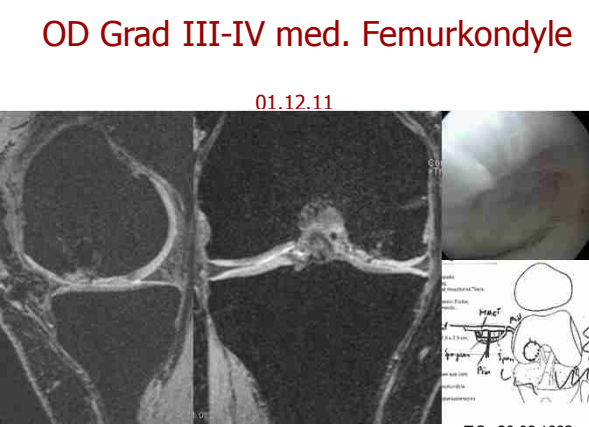
---

---

---

### OD Grad III-IV med. Femurkondyle

01.12.11



T.S., 20.08.1993

---

---

---

---

---

---

---

---

### Zusammenfassung

- Mikrofraktur mit Biomaterial:
  - bisher kein entscheidender klinischer Vorteil
  - arthroskopisch durchführbar in Abhängigkeit von Lokalisierung (keine Kompromisse!)
  
- OCT / zellfreie Plugs:
  - kleinere Defekte: arthroskopisch möglich
  - größere Defekte: mini-open

---

---

---

---

---

---

---

---

### Zusammenfassung

- ACT (arthroskopisch):
  - Sphäroid-Technik
  - Gelförmige Anwendung (z.B. Novocart inject)
  
  - Vorteil: Anwendung an Tibiaplateau
- MACT (Mini-open):
  - Schwamm-artige Biomaterial-basierte Verfahren (Novocart 3D)
  
  - Vorteil: solide Verankerung (Naht)

---

---

---

---

---

---

---

---

Vielen Dank für die Aufmerksamkeit



---

---

---

---

---

---

---

---

### TIRM



Translation in Regenerative Medicine

Topik: Subchondraler Knochen  
07. / 08. Dezember 2012



---

---

---

---

---

---

---

---