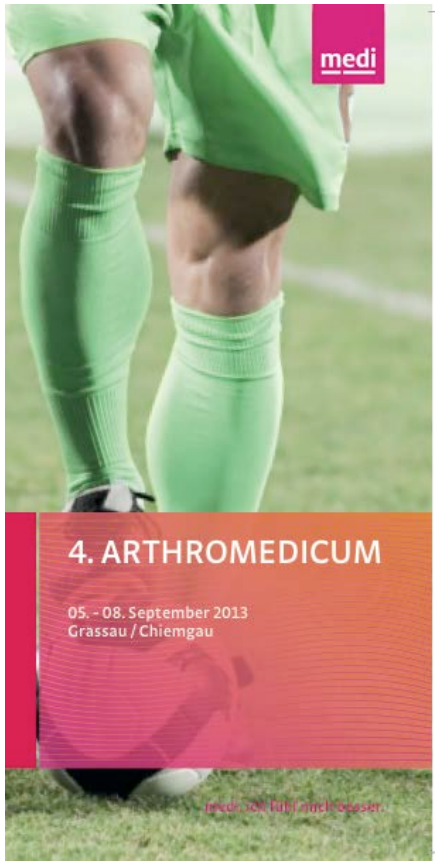
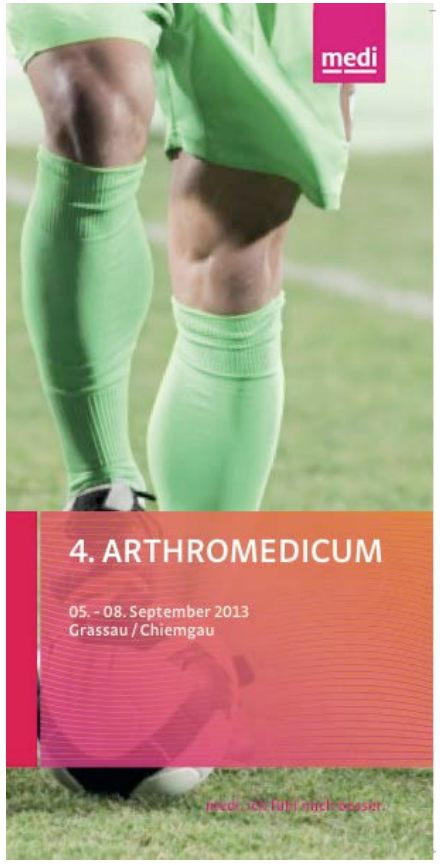


Intraartikuläre Knorpeltherapie
Cortison bis PRP (ACP)



O.Miltner

DOCORTHO

PRAXIS FÜR GANZHEITLICHE
ORTHOPÄDIE & UNFALLCHIRURGIE

Friedrichstr.94, 10117 Berlin

Schmerzen

DOCORTHO
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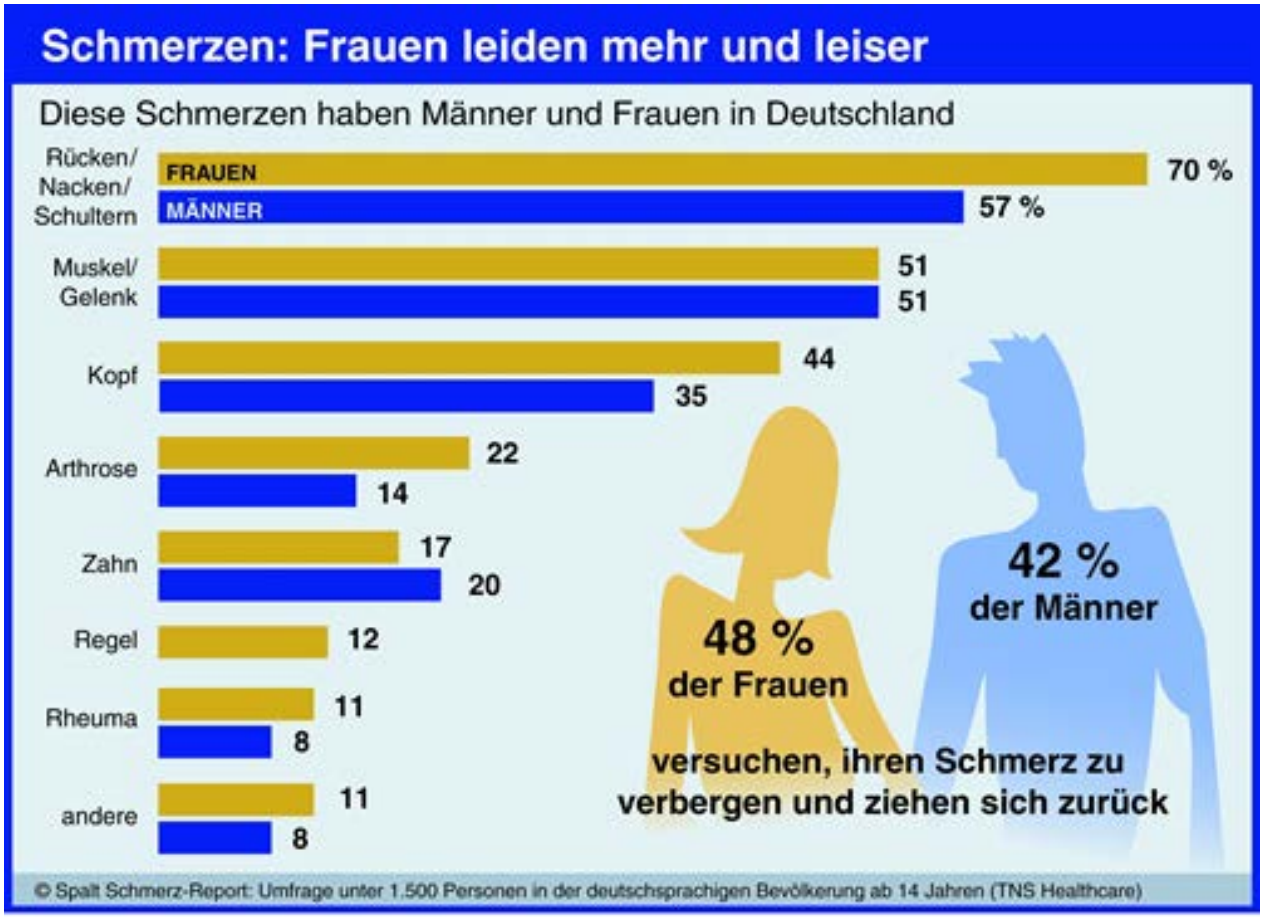

Arthrose

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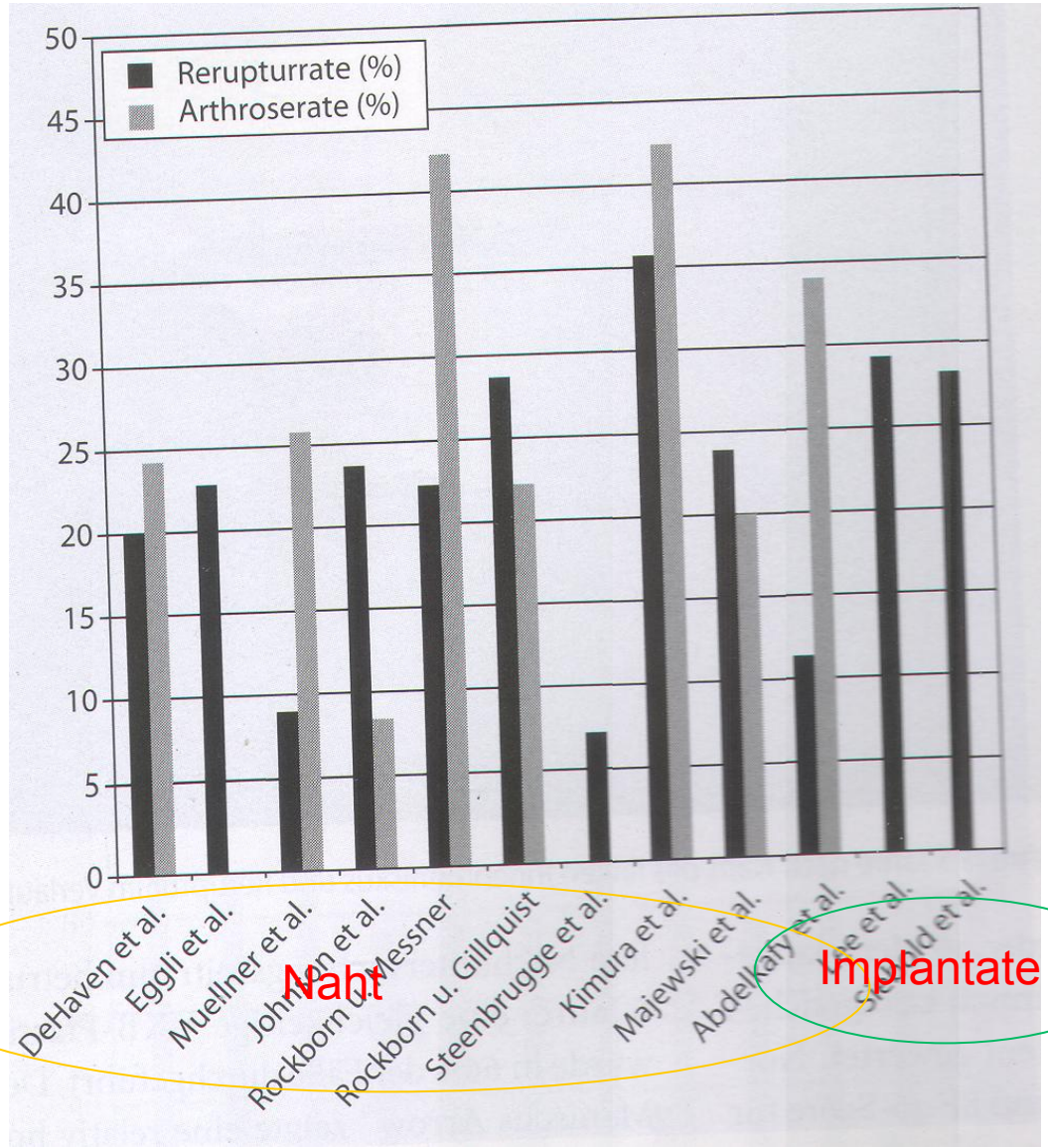
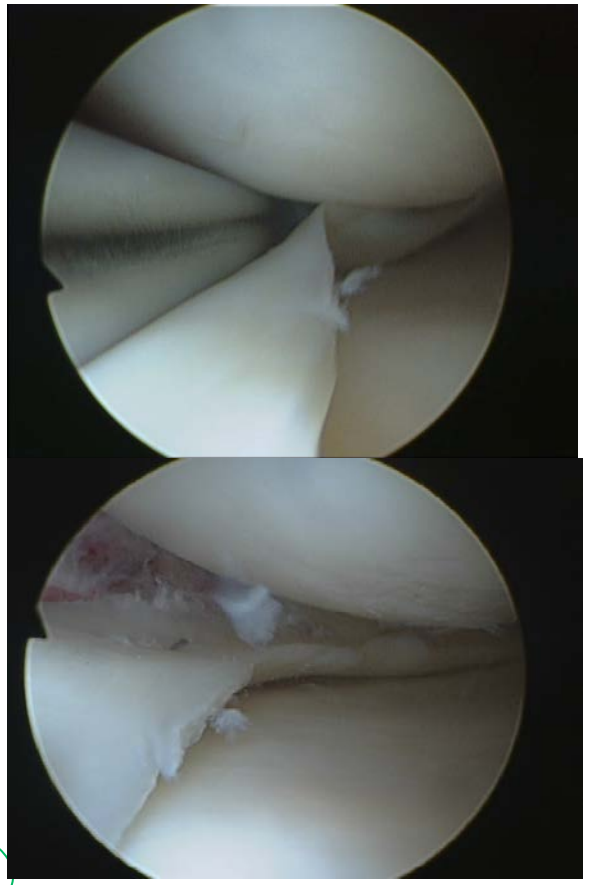
PRAXIS FÜR GANZHEITLICHE ORTHOPÄDIE & UNFALLCHIRURGIE





Behandlungsoptionen

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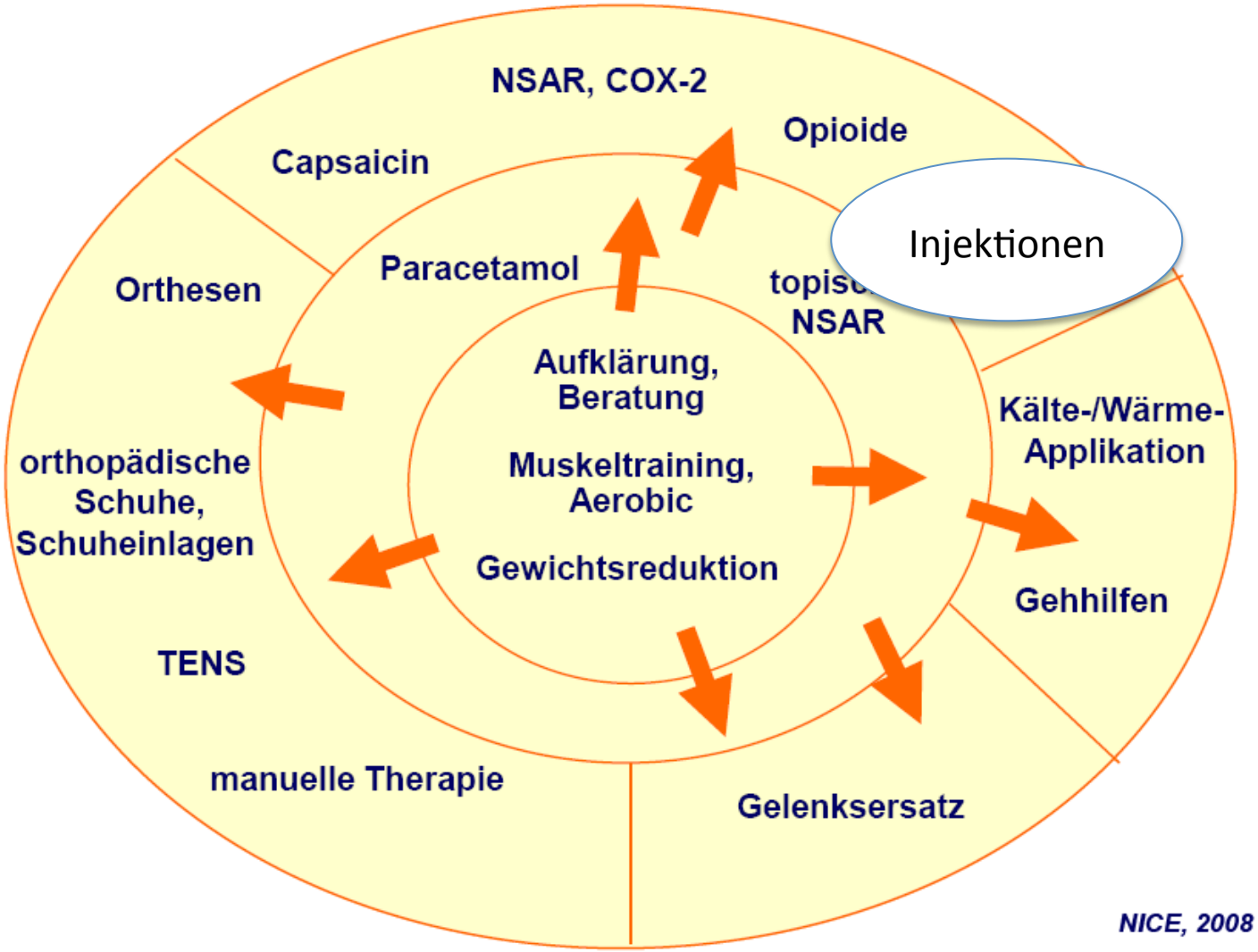
PRAXIS FÜR GANZHEITLICHE ORTHOPÄDIE & UNFALLCHIRURGIE



NICE, 2008

Review

DOCORTHO
PRAXIS FÜR GANZHEITLICHE ORTHOPÄDIE & UNFALLCHIRURGIE

OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. Osteoarthritis and cartilage 2008; 16: 137-162

Zhang W, **Moskowitz RW**, **Nuki G**, **Abramson S**, **Altman RD**, **Arden N**, **Bierma-Zeinstra S**, **Brandt KD**, **Croft P**, **Doherty M**, **Dougados M**, **Hochberg M**, **Hunter DJ**, **Kwoh K**, **Lohmander LS**, **Tugwell P**.

University of Edinburgh, Osteoarticular Research Group, The Queen's Medical Research Institute, 47 Little France Crescent, Edinburgh EH16 4TJ, United Kingdom.

16 Experten; 2 Kontinenten, 6 Länder; 4 Disziplinen
Systematischer Review von 1945-2006;

Level of evidence (LoE)
Effect size for pain (ES)
Strength of recommendation (SOR)

Medikamente

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	LoE	ES (Pain)	SOR (%)
1.Paracetamol Knie (bis 4g/Tag)	Ia	0,21	92 %
2.Paracetamol Hüfte (bis 4g/Tag)	IV	0,21	92 %
3.NSAR ; COX-2	Ia	0,32	93 %
4.Topische NSAR; Capsaicin	Ia	0,32	85 %
5. Glucosamin	Ia	0,45	63 %
6. Chondroitin	Ia	0,30	63 %
7. Glucosaminsulfat / Chondroitinsulfat	Ib		41 %
8.Steroide i.a. (Knie)	Ia	0,72	78%
9.Steroide i.a.(Hüfte)	Ib	0,72	78 %
10.Hyaluronsäure	Ia	0,32	64 %

Medikamente

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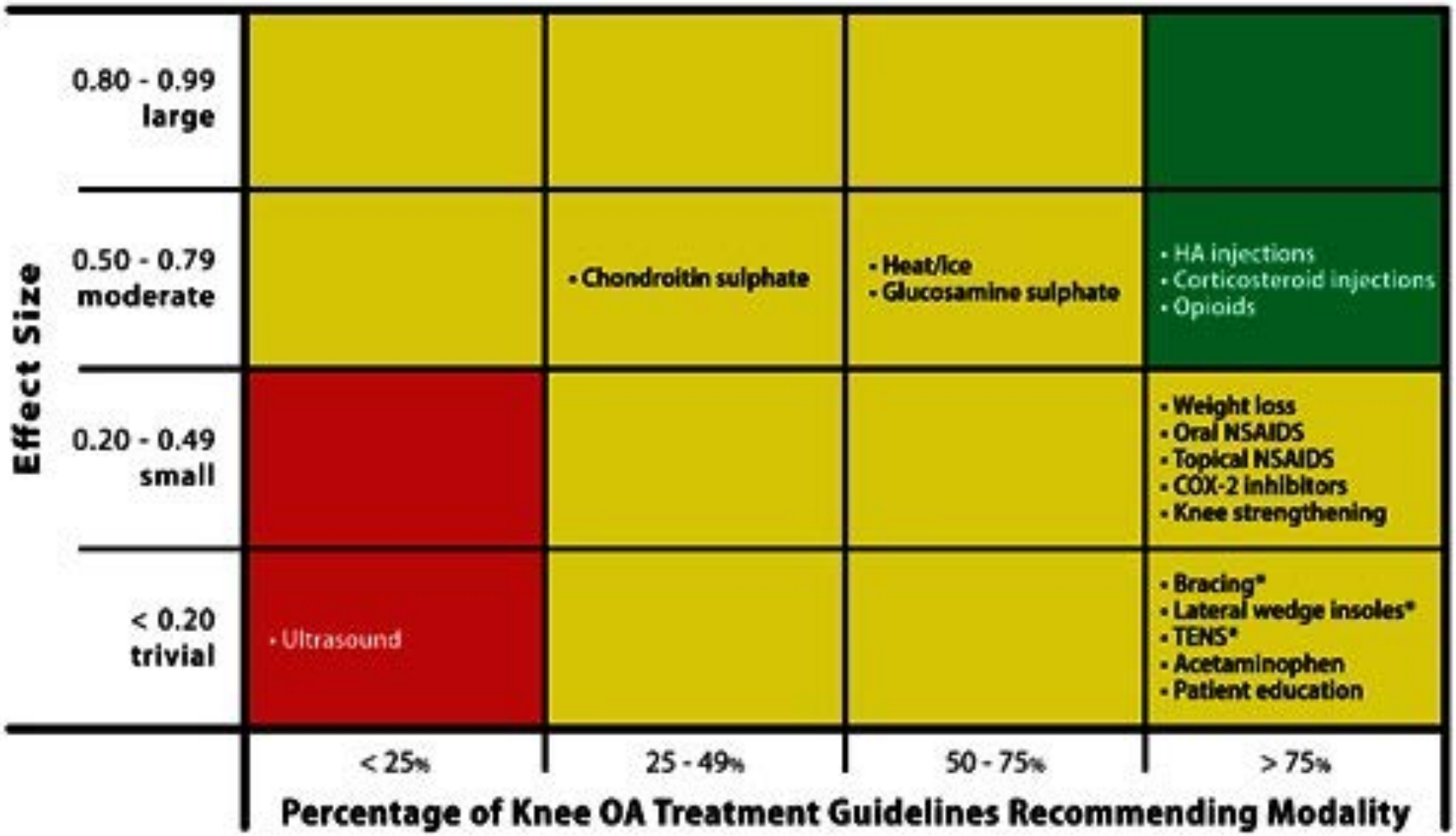

Crawford 2013

Kortison

DOCORTHO
PRAXIS FÜR GANZHEITLICHE ORTHOPÄDIE & UNFALLCHIRURGIE

THE VALUE OF INTRA-ARTICULAR INJECTIONS IN OSTEOARTHRITIS OF THE KNEE

JAMES H. MILLER, JOHN WHITE and THOMAS H. NORTON, GLASGOW, SCOTLAND

Contradictory views have been expressed by different authors about the effect of intra-articular injections in osteoarthritis. Key (1933) actually claimed to have produced osteoarthritis experimentally with agents similar to those later used therapeutically by other observers. It is therefore not surprising that perplexity is felt about the value of these injections.

Waugh (1938) stimulated interest in this form of treatment, using lactic acid with procaine, and this solution has also been investigated by several other authors (Ramamurthi 1947, Sønder 1950). A wide variety of other substances has been used—for example, acid potassium phosphate (Crowe 1944), sodium bicarbonate (Kron 1948), and procaine alone (Baker and Chayen 1948, Melkild 1953). The introduction of the cortisone group of drugs has popularised this form of treatment, and accounts of the use of hydrocortisone have been given by Hollander, Brown, Jessar and Brown (1951), by Bornstein *et al.* (1954), and by Fallet and Lambelet (1955). Ross, Mayer and Shepherd (1958) reported the use of benzyl salicylate. Of all these substances, lactic acid with procaine, procaine alone, and hydrocortisone are still commonly used.

THE JOURNAL OF BONE AND JOINT SURGERY

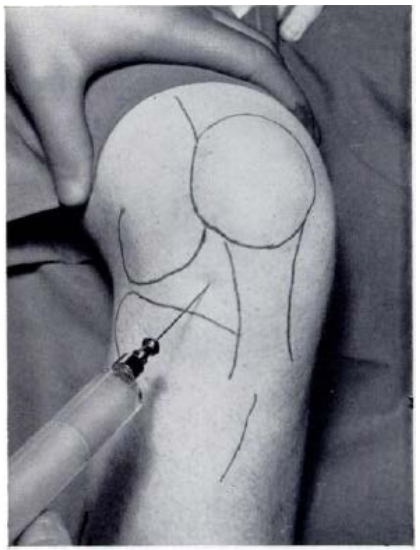

FIG. 1
This illustrates the triangular area through which the joint puncture is made, the needle being directed upwards and medially.

PATIENTS' OPINIONS SIX MONTHS AFTER CESSATION OF TREATMENT

Opinion	Injection					Total
	1 Lactic acid + Novocaine	2 Novocaine	3 Saline	4 Hydrocortisone	5 Mock	
Improved	29	30	32	30	24	145
Unchanged	2	—	1	1	4	8
Worse	1	4	1	3	5	14
Total	32	34	34	34	33	167

Kortison

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Ergebnisse bzgl Knie:

- 13 Placebo RCT
- 11/13 Guidelines
- Schmerzreduktion: 0,72 (0,42-1,02)
- Dauer 1-3 Wo.
- Schmerzverstärkung nach 4- 24 Wo.
- Funktionsverbesserung n.s.
- Erguß ?
- Triamzinolon vs. Betametason
- 4 Spritzen pro Jahr

Ergebnisse bzgl. Hüfte:

- 2 RCT;
- Kortison vs. Lokale: 3 Mon. Sx-besserung
- Kortison vs. Kochsalz: keine Verbesserung

Osteoarthritis and cartilage 2008; 16: 137-162
J Am Acad Orthop Surg. 2009; 638-646

Symptomatic slow acting drugs (SYSADOA)

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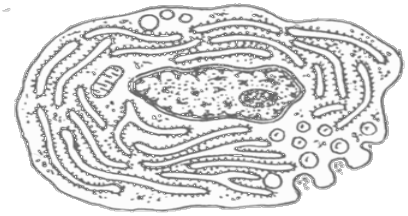
Hyaluronsäure

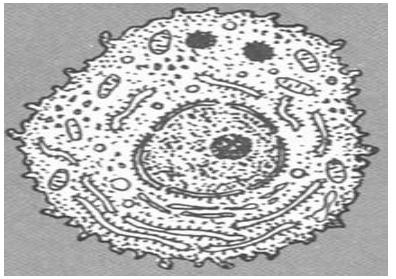
Entzündungszellen

Regulation der Zellaktivität
(Corrado et al.)



Synovialzellen

Neusynthese von HA
(Smith & Ghosh)



Chondrozyten

Verbesserung des Zellmetabolismus
(Guidolin et al.)

Gelenkknorpel

Reduktion des Entzündungsprozess

Verbesserung oberflächliche Schicht

Matrix Synthese

Schmerz- und Funktionsverbesserung

Miltner et al.

Hyaluronsäure

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Ergebnisse bzgl Knie:

- 8/9 Guidelines
- 22 Placebo RCT
- 2 Metaanalyse für RCT signifikante Verbesserung
- 1 Metaanalyse für RCT keine Verbesserung
- Schmerzreduktion: 0,32 (0,17-0,47)
- Schmerzreduktionsdauer 2-3 Mon.
- Funktionsverbesserung 6 Mon.
- Wirkungseintritt nach 5-13 Wochen
- Hochmolekulare Hyaluronsäure ist effektiver
- Verbesserter Effekt wenn additiv mit Steroide

Ergebnisse bzgl. Hüfte:

- Kein Unterschied bzgl. Molekulargewicht
- Verbesserung uneinheitlich

Osteoarthritis and cartilage 2008; 16: 137-162
Rheumatol Int. 2006 Feb;26(4):314-9.

Disease modifying OA drugs (DMOAD)

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Platelet Rich Plasma(PRP)

Tab. II: Analyse des autologen conditionierten Plasma (ACP).

Faktor	Name	Bildungsort	Wirkungen
IGF-I	insulin-like growth factors	aktivierte Thrombozyten	Stimulierung der Proliferation und Differenzierung der Osteoblasten
EGF	epidermal growth factor	aktivierte Thrombozyten	Stimulierung der Proliferation und Differenzierung epidermaler Zellen, co-Stimulans der Angiogenese
VEGF	vascular endothelial growth factor	Leukozyten Endothelzellen	Stimulierung der Angiogenese, Chemo-Attraktor für Osteoblasten
PDGF aa PDGF bb	platelet-derived growth factors	aktivierte Thrombozyten	Mitogene für mesenchymale Stammzellen, Förderung der Produktion der extrazellulären Matrix
TGF-beta1 TGF-beta2	transforming growth factors	aktivierte Thrombozyten	Stimulierung der DNS-Synthese und der Proliferation und Differenzierung verschiedener Zelltypen. Förderung der Kollagensynthese

Buhr&Siekmann 2009

Indikationen - PRP

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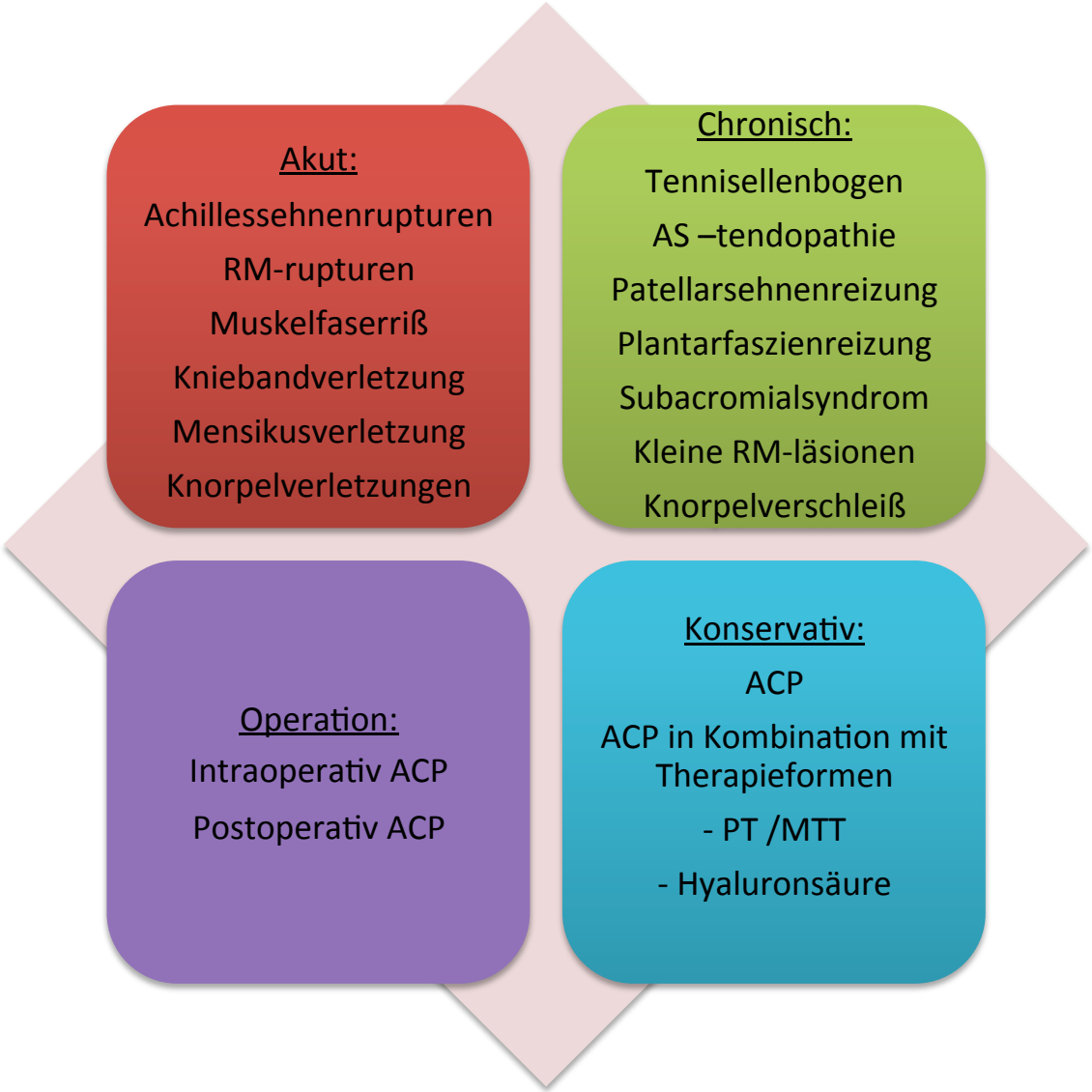

PRP

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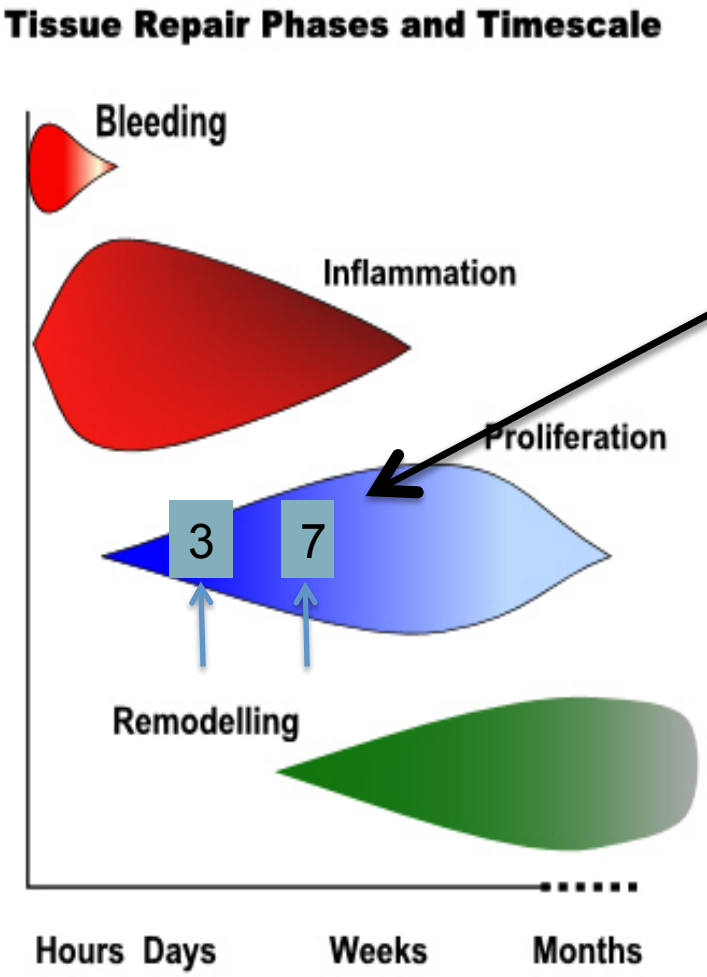

Optimaler Injektionszeitpunkt

Chan et al 2006

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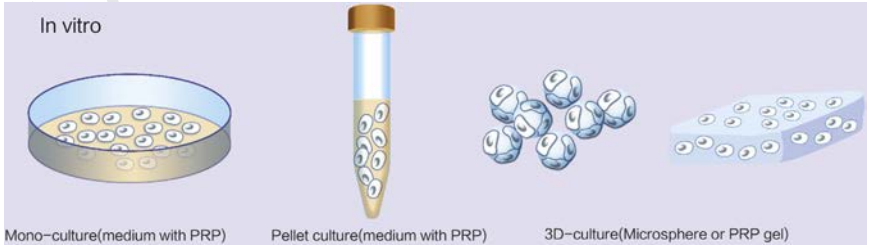

Cell type	Classification of PRP[58]	PRP application to culture	Outcome	Reference
a. PRP for chondrocyte culture				
Human chondrocytes	P2-x-NA	Cells seeded on gelatin microcarriers sealed with PRP	Improve cell proliferation and ECM synthetize and maintain cell phenotype	59
Porcine chondrocytes	P3-x-Aα	10% PRP release in serum-free medium	Improve cell proliferation and matrix biosynthesis, PG and collagen synthesis	60
Human chondrocytes	P4-B	In mono- and 3-D cultures	Improve cell proliferation and ECM synthetize and maintain cell phenotype	61
New Zealand white rabbit chondrocytes	P4-NA	20% PRP in DMEM	Improve cell proliferation and increase aggrecan, BMP-2, BMP7, col-II expression in the long-term	62
Japanese white rabbit chondrocytes	P4-x-NA	3% PRP with alginate beads	Increase chondrocyte GAG synthesis and maintain cell phenotype.	28
Human articular chondrocytes	NA-x-Bβ	In mono- and 3-D cultures	Improve chondrocyte proliferation but reduce type II collagen, aggrecan and BMP-2	17
Bovine articular chondrocytes	NA-x-Bβ	In mono- and 3-D cultures	Improve chondrocyte proliferation but reduce type II collagen, increase type I collagen	18

Anaboler Effekt auf Chondrocyten
Verbesserung Zell- und Matrixproliferation
Antiinflammatorischer Effekt

Zhu et al. 2013

Basic science and clinical application of platelet-rich plasma for cartilage defects and osteoarthritis: a review

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COMPARATIVE STUDY

PATIENT SELECTION

50 patients - P.R.P.
50 patients - Low Molecular Weight H.A.
50 patients - High Molecular Weight H.A.

INCLUSION CRITERIA

- **monolateral lesion**
- **chronic (at least 4 months) pain**
  or swelling of the knee
- **imaging findings (X Ray or MRI)**
  of degenerative changes

Kon – AAOS 2011

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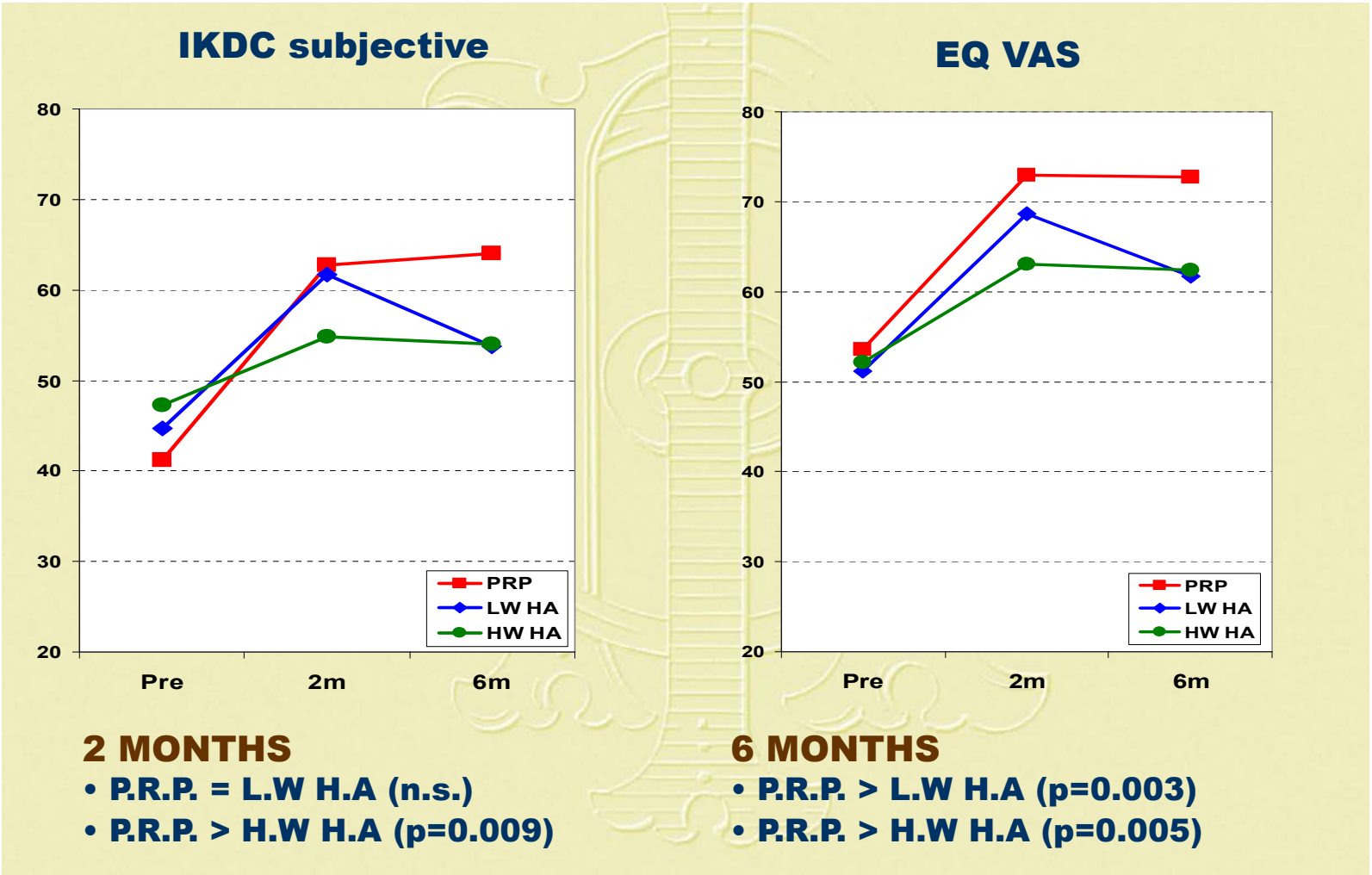

2 MONTHS
- P.R.P. = L.W H.A (n.s.)
- P.R.P. > H.W H.A (p=0.009)

6 MONTHS
- P.R.P. > L.W H.A (p=0.003)
- P.R.P. > H.W H.A (p=0.005)

Kon – AAOS 2011

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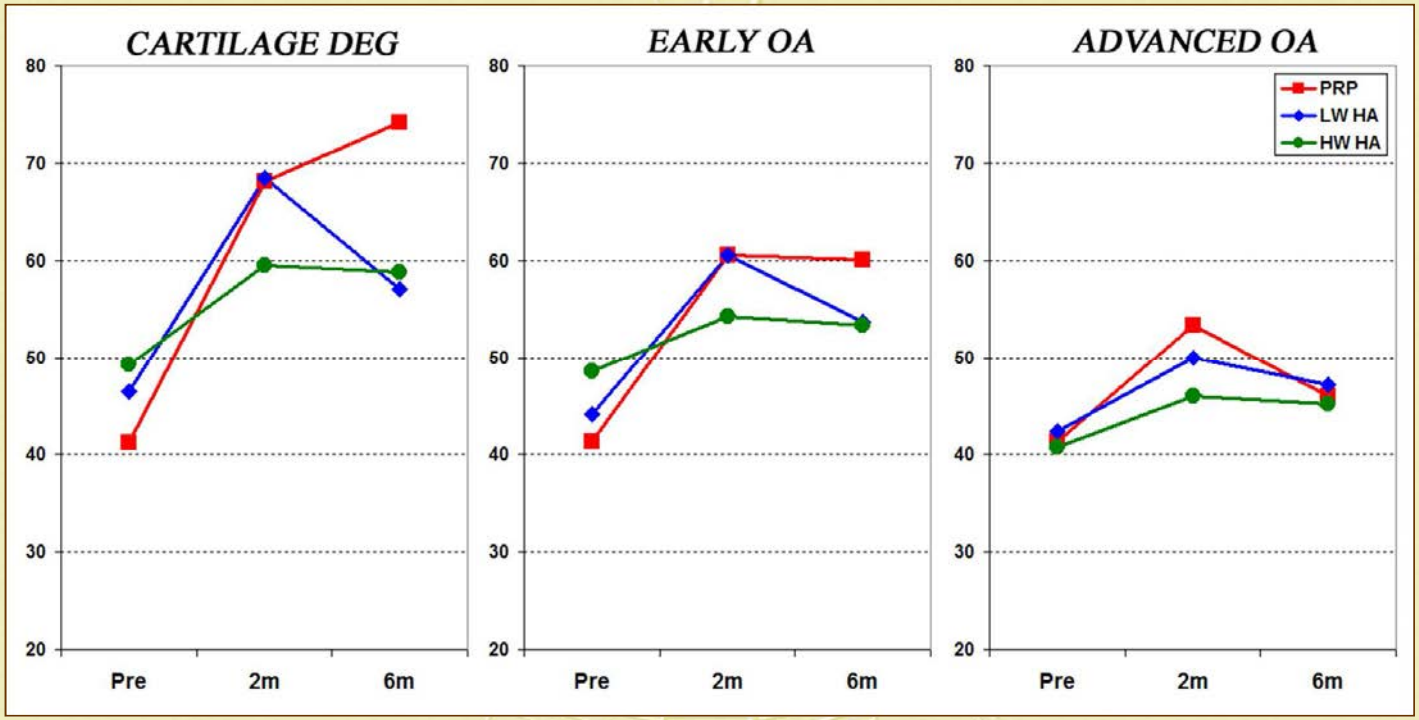

SIMILAR RESULTS AT 2 m FOR P.R.P. AND L.W. H.A.

WORST RESULTS FOR HIGHER DEGREE OF KNEE DEGENERATION FOR ALL TREATMENTS

Kon – AAOS 2011

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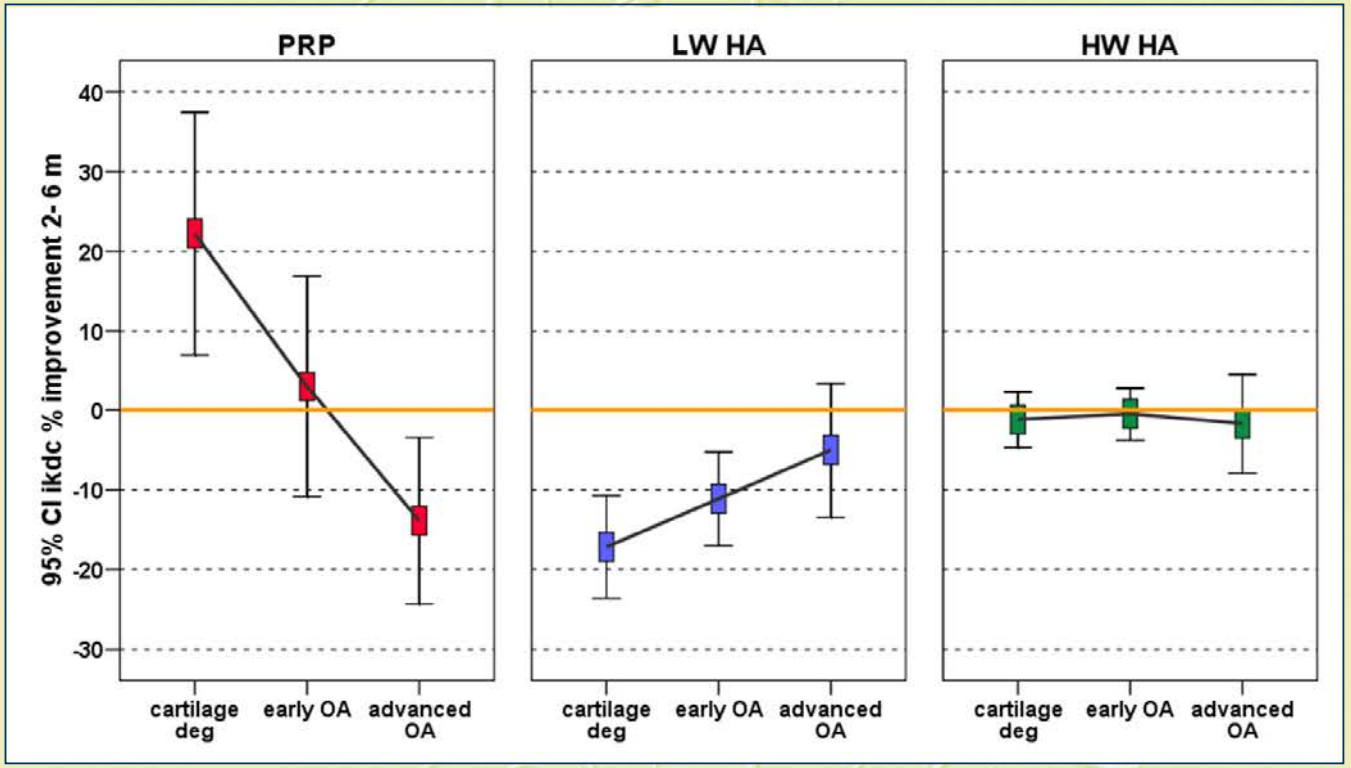

✓ **P.R.P: FURTHER IMPROVEMENT FOR CARTILAGE DEGENERATION**

Kon – AAOS 2011

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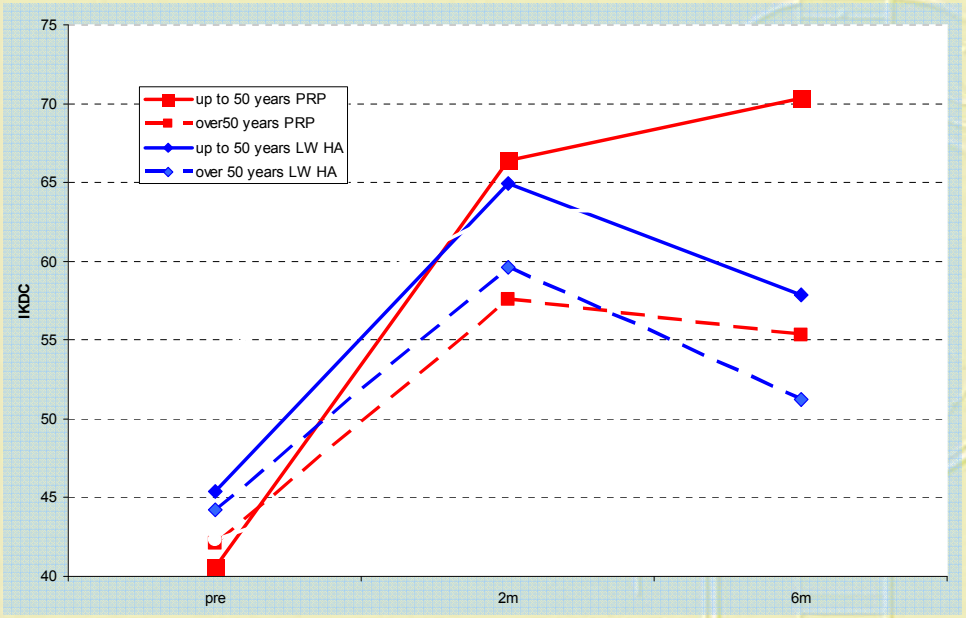

< 50 YEARS

2 m: P.R.P. = L.W H.A

6 m: P.R.P. > L.W H.A (p=0.001)

> 50 YEARS

2 m: P.R.P. = L.W H.A

6 m: P.R.P. = L.W H.A

YOUNG PATIENTS IN PRP GROUP CONTINUE TO IMPROVE FROM 2 TO 6 MONTHS

NO SIGNIFICANT DIFFERENCE FOR OLDER PATIENTS BETWEEN 2 GROUPS

Kon – AAOS 2011

The American Journal of Sports Medicine
http://ajs.sagepub.com/

Comparison Between Hyaluronic Acid and Platelet-Rich Plasma, Intra-articular Infiltration in the Treatment of Gonarthrosis

Fabio Cerza, Stefano Carnì, Alessandro Carcangiu, Igino Di Vavo, Valerio Schiavilla, Andrea Pecora, Giuseppe De Biasi and Michele Ciuffreda

Am J Sports Med 2012 40: 2822 originally published online October 25, 2012
DOI: 10.1177/0363546512461902

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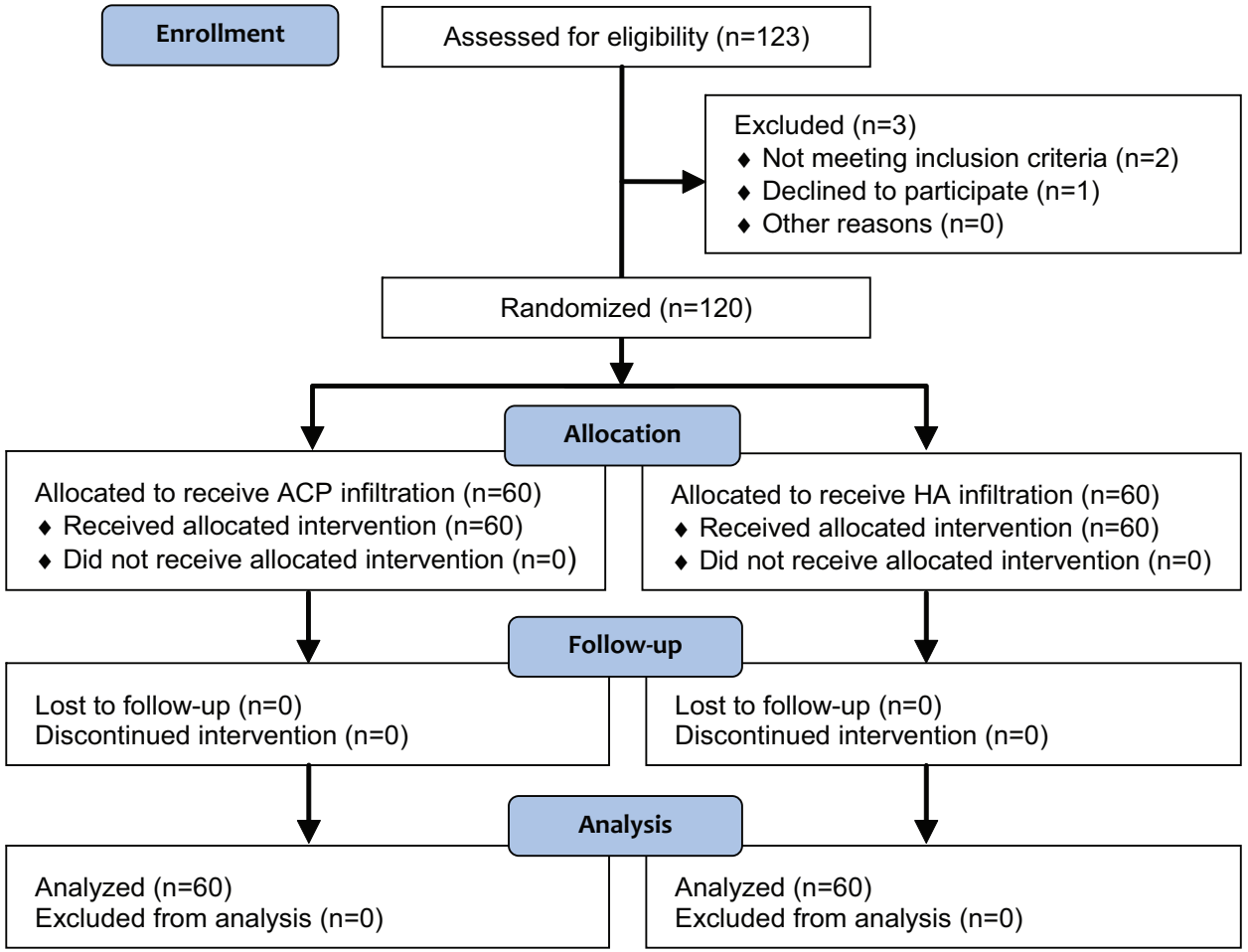

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TABLE 1
Demographic Information[a]

	ACP Group	HA Group
Average age (SD), y	66.5 (11.3)	66.2 (10.6)
Male patients, No. (%)	25 (42)	28 (47)
Female patients, No. (%)	35 (58)	32 (53)
Left knee, No.	17	12
Right knee, No.	43	48
Gonarthrosis, No. (%)		
Grade I	21 (35)	25 (42)
Grade II	24 (40)	22 (37)
Grade III	15 (25)	13 (21)

[a]ACP, autologous conditioned plasma; HA, hyaluronic acid; SD, standard deviation.

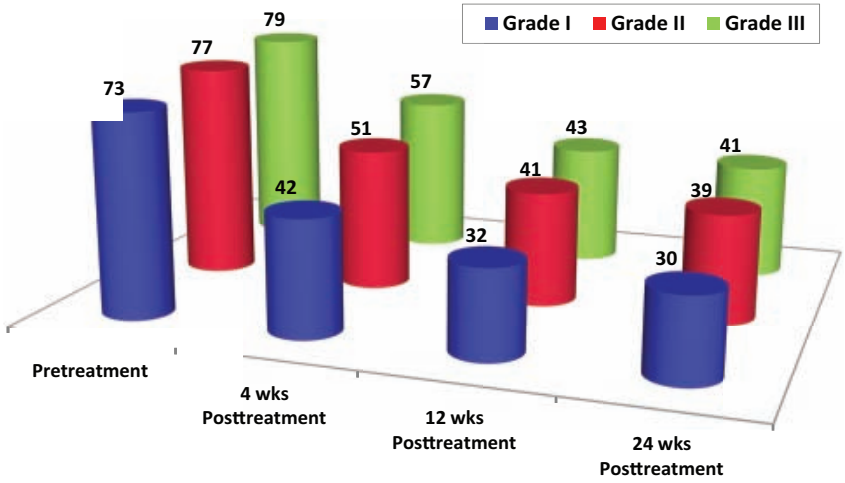

Figure 2. Mean Western Ontario and McMaster (WOMAC) scores for the autologous conditioned plasma (ACP) group in relation to degree of gonarthrosis.

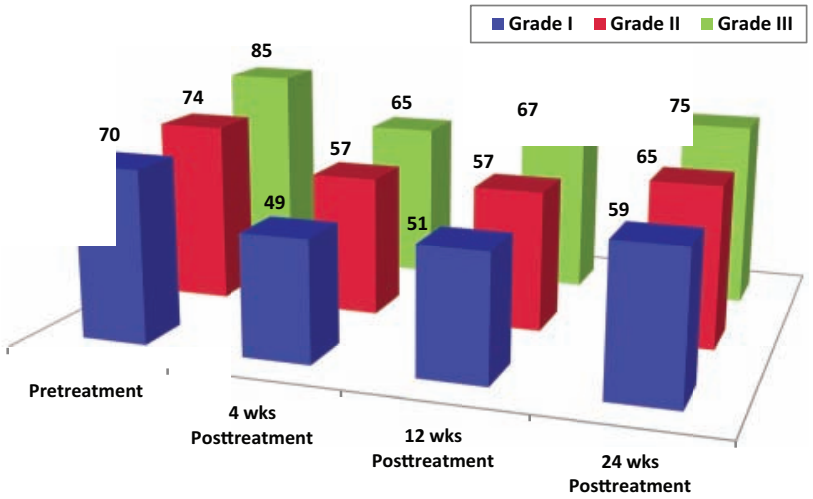

Figure 3. Mean Western Ontario and McMaster (WOMAC) scores for the hyaluronic acid (HA) group in relation to degree of gonarthrosis.

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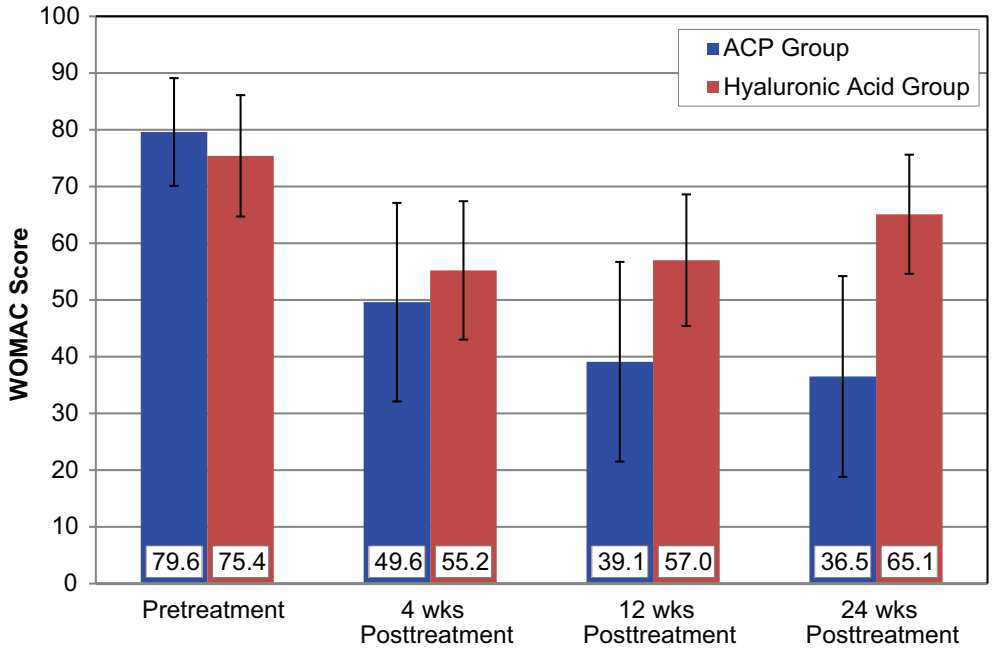

Figure 4. Mean Western Ontario and McMaster (WOMAC) scores for the autologous conditioned plasma (ACP) and hyaluronic acid (HA) groups.

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Background: Arthrosis is particularly prevalent in the knee. Infiltration treatment for gonarthrosis is among the most widely used techniques in orthopaedic practice.

Purpose: To compare the clinical response of hyaluronic acid (HA) and platelet-rich plasma (PRP) treatment in 2 groups of patients affected by gonarthrosis.

Study Design: Randomized controlled trial; Level of evidence, 1.

Methods: A total of 120 patients affected by clinically and radiographically documented gonarthrosis were included in this study. The gonarthrosis was graded using the Kellgren-Lawrence radiographic classification scale. The 120 patients were randomized into 2 study groups in a 1:1 ratio: 60 patients received 4 intra-articular injections of PRP (specifically, autologous conditioned plasma [ACP], 5.5 mL), and 60 patients received 4 intra-articular injections of HA (20 mg/2 mL). An unblinded physician performed infiltration once a week for 4 weeks into the knee affected by clinically relevant gonarthrosis (in both groups). All patients were evaluated with the Western Ontario and McMaster (WOMAC) score before the infiltration and at 4, 12, and 24 weeks after the first injection.

Results: Treatment with a local injection of ACP had a significant effect shortly after the final infiltration and a continuously improving sustained effect up to 24 weeks (WOMAC score, 65.1 and 36.5 in the HA and ACP groups, respectively; $P < .001$), where the clinical outcomes were better compared with the results with HA. In the HA group, the worst results were obtained for grade III gonarthrosis, whereas the clinical results obtained in the ACP group did not show any statistically significant difference in terms of the grade of gonarthrosis. The mean WOMAC scores for grade III gonarthrosis were 74.85 in the HA group and 41.20 in the ACP group ($P < .001$).

Conclusion: Treatment with ACP showed a significantly better clinical outcome than did treatment with HA, with sustained lower WOMAC scores. Treatment with HA did not seem to be effective in the patients with grade III gonarthrosis.

Keywords: platelet-rich plasma; hyaluronic acid; gonarthrosis; intra-articular infiltration

Conclusion: Treatment with ACP showed a significantly better clinical outcome than did treatment with HA, with sustained lower WOMAC scores. Treatment with HA did not seem to be effective in the patients with grade III gonarthrosis.

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Autor	Behandlung	Type of study	Level of evidence	Anzahl Patienten	Ergebnis
Patel (2012)	PRP vs. Placebo	Prospective Double-blind randomized study	Level 1	PRP group (n=52)/(n=50) NACL (n=46)	WOMAC (**) 1 Inj = 2 Inj PRP
Spakova (2012)	PRP vs HA	Prospective Cohort study	Level 1	PRP group (n=60) HA (n=60)	Western Ontario (**) VAS (**) 3 Inj
Filardo (2012)	PRP vs HA	Double blind randomized controlled study	Level 1	PRP group (n=54) HA (n=55)	IKDC VAS Tegner KOOS Nach 1 J (**)

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Table IV
Dual character of PRP use for cartilage repair and OA in clinical

The strong facts for the use of PRP in clinical	The poor support for the use of PRP in clinical
Improve WOMAC, AOFAS and VAS scores.	Increased type I collagen which not exist in hyaline cartilage.
Symptomatic relief in early OA and improve clinical outcome[85].	Produce fibrous cartilage.
Inflammation reduction.	Stimulates angiogenesis[86]

Zhu et al. 2013

Basic science and clinical application of platelet-rich plasma for cartilage defects and osteoarthritis: a review

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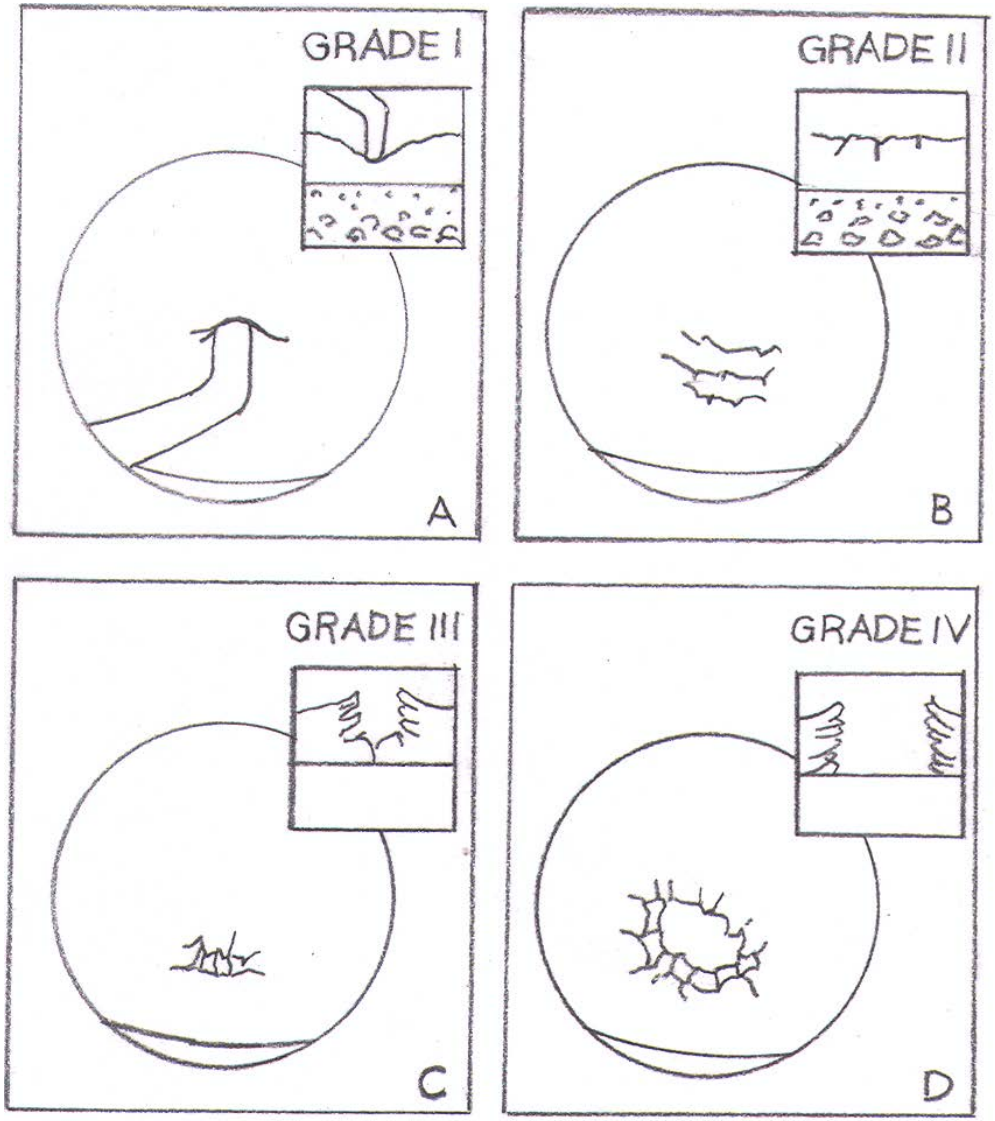
Eigene Anwendung



Illustriert E.Heuter

Pat < 50 Jahre

2-3 ACP – 1x Woche

Arthrose

Rheumatology (Oxford). 2012 Jan;51(1):144-50.

Ultrasound-guided platelet-rich plasma injections for the treatment of osteoarthritis of the hip.

Sánchez M, Guadilla J, Fiz N, Andia I.

Source

Departamento de Investigación, Osakidetza, Basque Health Service, B° Arteaga 107, 48170 Zamudio, Vizcaya.

Abstract

OBJECTIVE:

To assess the safety and symptomatic changes of IA injections of platelet-rich plasma (PRP) in patients with OA of the hip.

METHODS:

Forty patients affected by monolateral severe hip OA were included in the study. Each joint received three IA injections of PRP, which were administered once a week. The primary end point was meaningful pain relief, which was described as a reduction in pain intensity of at least 30% from baseline levels as evaluated by the WOMAC subscale at 6-months post-treatment. The visual analogue scale (VAS) and Harris hip score subscale for pain were used to verify the results. Secondary end points included changes in the level of disability of at least 30% and the percentage of positive responders, i.e. the number of patients that achieved a >30% reduction in pain and disability.

RESULTS:

Statistically significant reductions in VAS, WOMAC and Harris hip subscores for pain and function were reported at 7 weeks and 6 months ($P < 0.05$). Twenty-three (57.5%) patients reported a clinically relevant reduction of pain (45%, range 30-71%) as assessed by the WOMAC subscale. Sixteen (40%) of these patients were classified as excellent responders who showed an early pain reduction at 6-7 weeks, which was sustained at 6 months, and a parallel reduction of disability. Side effects were negligible and were limited to a sensation of heaviness in the injection site.

CONCLUSIONS:

This preliminary non-controlled prospective study supported the safety, tolerability and efficacy of PRP injections for pain relief and improved function in a limited number of patients with OA of the hip.

Cortison vs. PRP

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