IL GINOCCHIO VARO ARTROSICO: INQUADRAMENTO CLINICO

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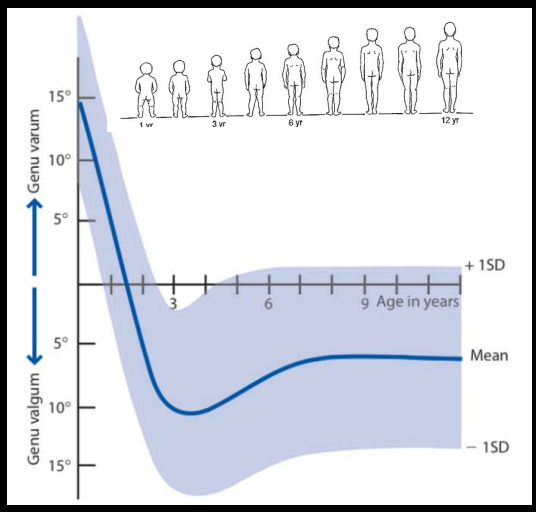
MAJOR CAUSES OF KNEE OA

BIOLOGICAL

MECHANICAL

THE VARUS KNEE

CHANGES OF LOWER LIMB ALIGMENT DURING GROWTH



PHISIOLOGICAL VARUS UNTIL TWO YEARS

VALGUS ALIGNMENT (3-6°) FROM 6-7 YEARS

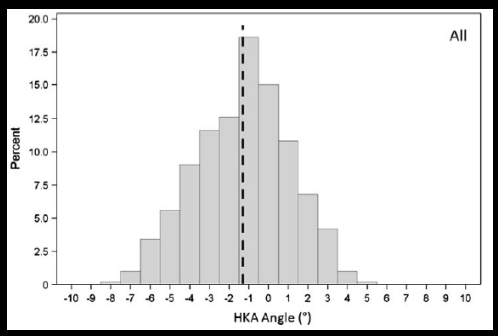
THE VARUS KNEE

HOWEVER….

32% ASYMPTOMATIC MALES

17% ASYMPTOMATIC FEMALES

CONSTITUTIONAL VARUS (>3°)



Bellemans CORR 2013

HIGH-IMPACT SPORTS IS ASSOCIATED WITH BOWLEGS IN ADOLESCENT BOYS

Thijs, Bellemans MED SPORT SCI 2013

THE VARUS KNEE

EFFECTS OF VARUS ALIGNMENT ON KNEE JOINT

PHISIOLOGICALLY MEDIAL COMPARTMENT BEAR 60-80% OF COMPRESSIVE LOAD IN NORMALLY ALIGNED KNEE

VARUS INCREASE OF 4-6% INCREASE MEDAIL COMPARTMENT LOAD OF 20%

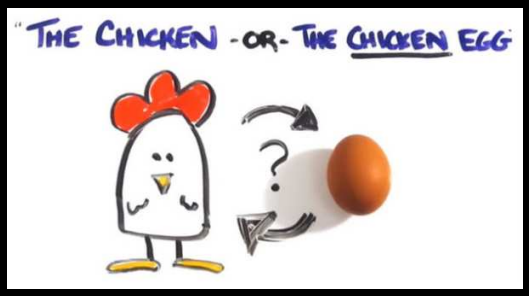
INCREASED STRESS ON ARTICULAR CARTILAGE AND JOINT STRUCTURES

DEGENERATIVE CHANGES

Tetsworth ORT CLIN NORD AM 1994

THE VARUS KNEE

DOES MALALIGNMENT INCREASE RISK OF OA?



CONFLICTING RESULTS

CONSTITUTIONAL VARUS DOES NOT AFFECT JOINT LINE ORIENTATION

MEDIAL OA CAUSES DIVERGENCE OF JOINT LINE

Bellemans CORR 2014

LIMITED EVIDENCE FOR MALALIGMENT AND OA DEVELOPEMENT

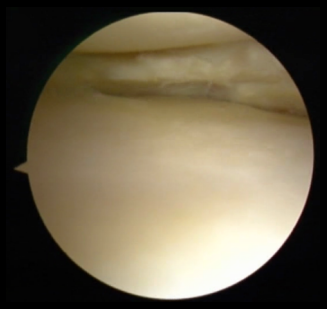
STRONG EVIDENCE FOR MALALIGNMENT AS RISK FACTOR OF OA PROGRESSION

Tanamas ARTH AND REUMAT 2009

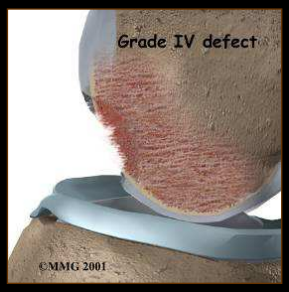
THE VARUS KNEE

…OTHER FACTORS CONTRUBUTE FOR MEDIAL OA DEVELOPMENT

MENISCAL DEFICIENCY



CARTILAGE PATHOLOGY



LIGAMENT INJURY

OFTEN THE VARUS KNEE WITH MEDIAL OA IS A COMPLEX MIX OF MULTI-STRUCTURE LESIONS

THE VARUS KNEE

HOW TO APPROACH VARUS KNEE?

THE VARUS KNEE

ACCURATE EVALUATION STARTS FROM PATIENTS HISTORY:

- AGE AND SEX
- WORK, OCCUPATION, HOBBIES, SPORT ACTIVITY
- RELEVANT TRAUMA (FRACTURES, MAJOR SPRAIN)
- PREVIOUS SURGERIES (MENISCUS, LIGAMENTS)

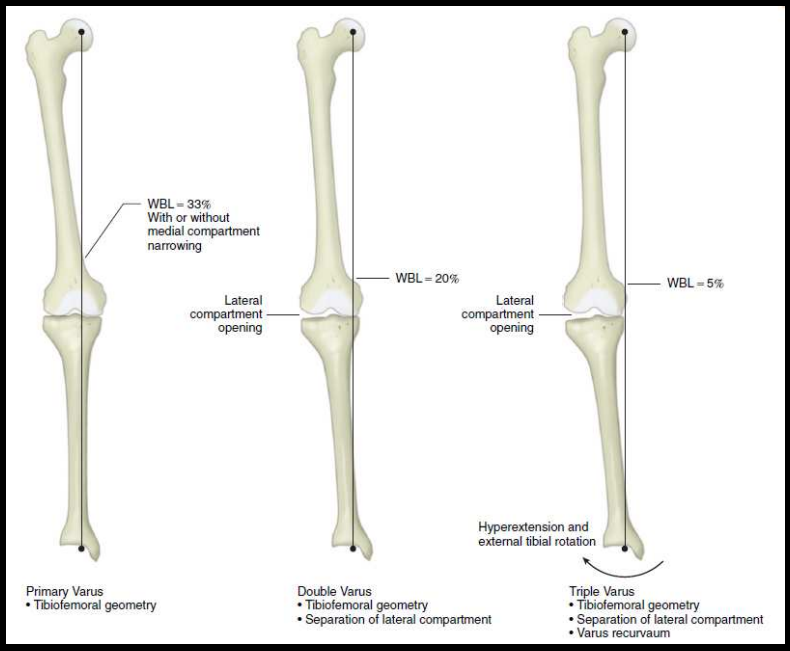
THE VARUS KNEE

RADIOLOGIC EVALUATION

- AP AND LATERAL RX
- ROSEMBERG PA 45° VIEW
- LONG LEG RX
- MRI

THE VARUS KNEE

CLINICAL AND RADIOGRAPHIC EVALUATION ALLOW TO CHARACTERIZE THE VARUS GRADE



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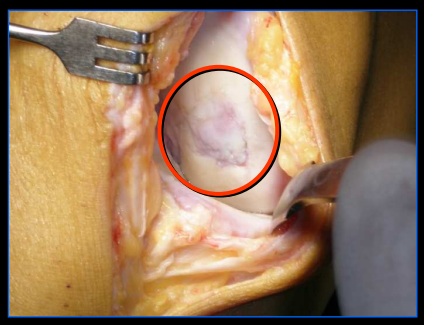
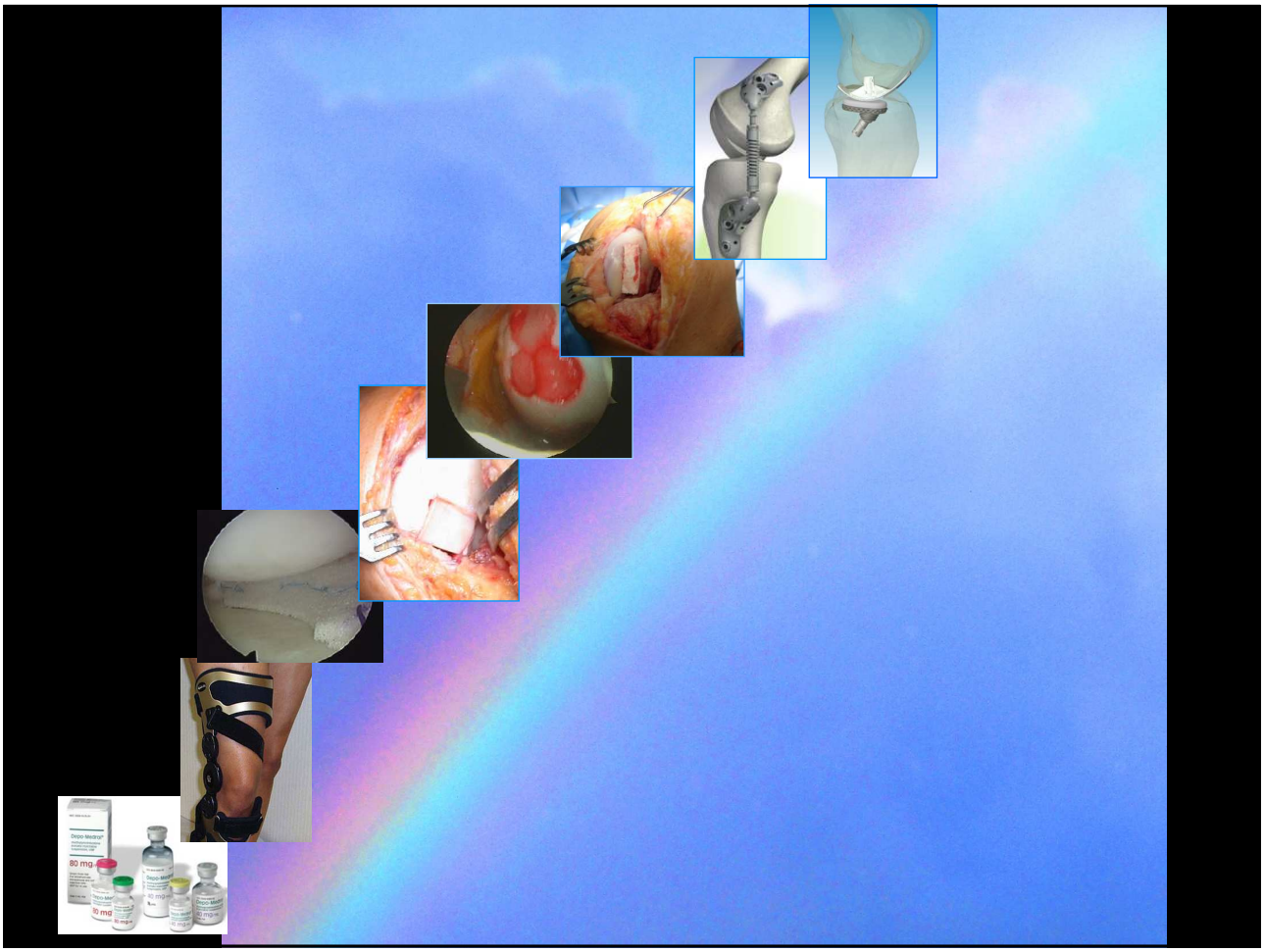


WHAT CAN WE DO?

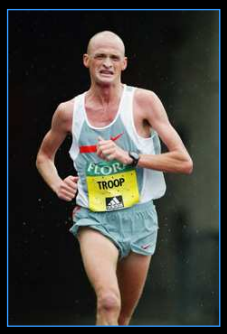

Depo-Medrol
80 mg
Depo-Medrol
40 mg/mL
Depo-Medrol
40 mg/mL
Depo-Medrol
40 mg/mL

CORRECT INDICATIONS KEY FACTORS

- ✓ TIMING OF PATHOLOGY
- ✓ SEVERITY OF INTRARTICULAR LESION
- ✓ VARUS DEGREE
- ✓ PATIENTS FEATURES
- ✓ PATIENTS ACTIVITY LEVEL







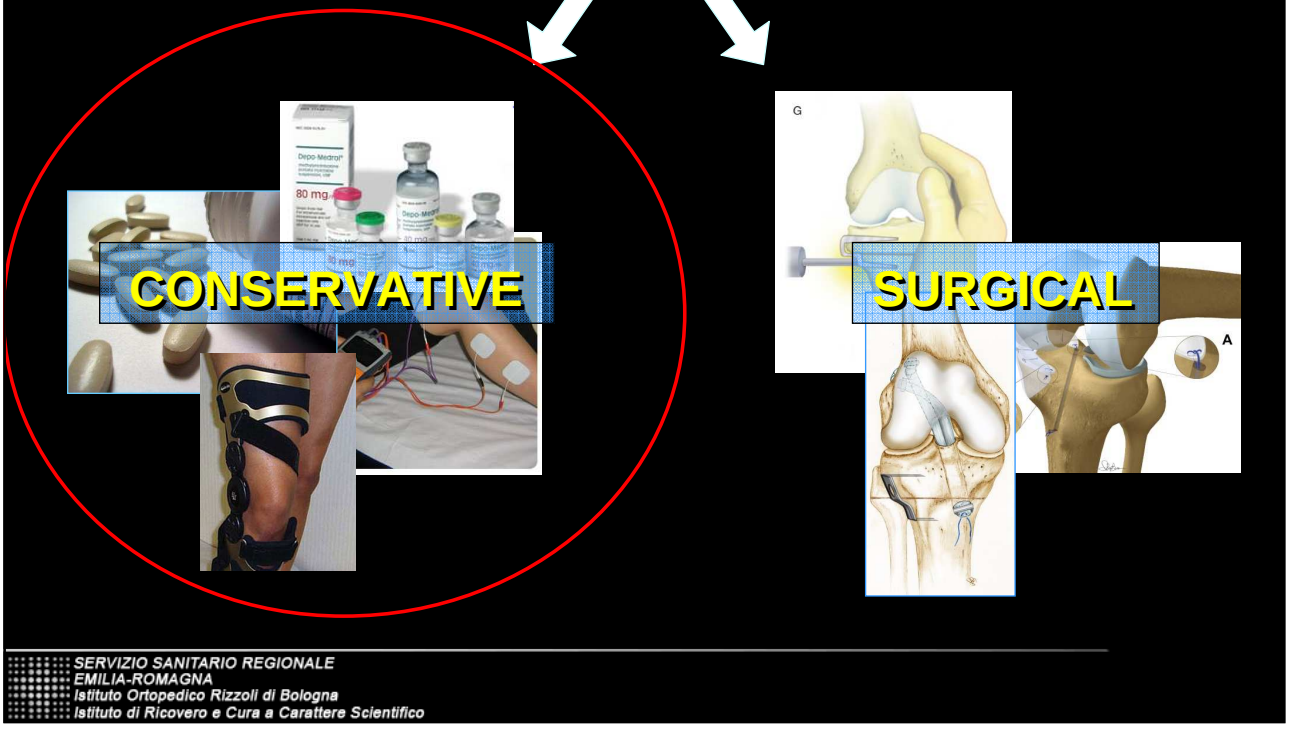

IN YOUNG PATIENT WITH SINGLE COMPARTMENT ARTHRITIS

BIOLOGICAL APPROACH

METAL APPROACH

WHAT IS BEST ?

MANAGEMENT OF VARUS DEGENERATIVE THE KNEE



CONSERVATIVE MANAGEMENT

1- PHARMACOLOGICAL:

ANALGESIC/ NSAIDs/

SLOW ACTING DRUGS

2- PHYSICAL AND

INSTRUMENTAL THERAPIES

3- INJECTIVE TREATMENTS
CORTICOSTEROIDS/ HYALURONIC ACID/
BLOOD DERIVATIVES/STEM CELLS

4- BRACES AND INSOLES

Kon E, Filardo G, Drobnic M, Madry H, Jelic M, van Dijk N, Della Villa S: Non surgical management of early osteoarthritis. (KSSA)

CONSERVATIVE MANAGEMENT

PHARMACOLOGY

PHARMACOLOGICAL MANAGEMENT

80% OA PATIENTS HAVE CONSTANT PAIN THAT LIMITS ADL

PHARMACEUTICAL AGENTS: WHAT IS THE MOST SUITABLE?

PARACETAMOL	• FIRST CHOICE FOR COST, EFFICACY AND SAFETY
NSAIDs	• ADMINISTRATION WHEN PARACETAMOL FAILED
TOPICAL NSAIDs	• **LESS SYSTEMIC EXPOSURE**
OPIOIDS	• **FOR PATIENTS WITH MARKED PAIN NOT RESPONSIVE TO OTHER DRUGS**

ONLY SYMPTOM RELIEF

CAREFUL ANALYSIS OF RISK/BENEFIT RATIO

CONSIDERED TOGETHER WITH OTHER CONSERVATIVE MEASURES

SYMPTOMATIC SLOW ACTING DRUGS

DIFFERENT MOLECULES: Glucosamine, Chondroitin sulfate, diacerein & nutritional supplements

LIMITED SCIENTIFICAL EVIDENCE:

NO CLEAR MECHANISM OF ACTION (Disease modifying drugs?)

SYMPTOMS RELIEF and FUNCTIONAL REGAIN POSSIBLE

INCREASED EFFICACY WHEN COMBINED WITH DIFFERENT THERAPEUTIC MODALITIES !!!

Sawitke AD, Shi H et al: Ann Rheum dis (2010)

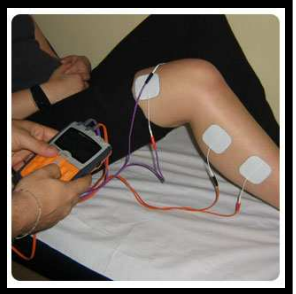
CONSERVATIVE MANAGEMENT

PHYSICAL AND INSTRUMENTAL THERAPY

INSTRUMENTAL THERAPIES

LOTS OF ALTERNATIVES:

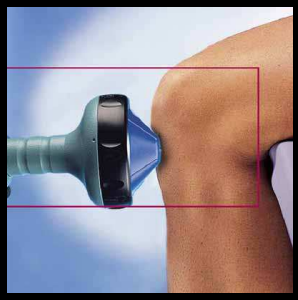
TENS, LIPUS, ESW, PEMFS …



ENCOURAGING PRE-CLINICAL STUDIES

but….

NO HIGH QUALITY CLINICAL TRIALS



NEED TO IMPROVE

OUR KNOWLEDGE

Gobbi A, Karnatzikos G et al. J Sports Traumatol (2011)

CONSERVATIVE MANAGEMENT

INJECTIVE TREATMENTS

CORTICOSTEROIDS

Universally accepted clinical use

ANTI-INFLAMMATORY AND IMMUNOSUPPRESSIVE ACTION

Pros

PAIN REDUCTION

Cons

TISSUE ATROPHY
CARTILAGE DEGENERATION
SYSTEMIC COLLATERAL EFFECTS

REPEATED USE SHOULD BE AVOIDED

Gerwin N, Hops C, Lucke A: Adv Drug Deliv Rev (2006)

VISCOSUPPLEMENTATION

Large clinical application but no clear evidence of effectiveness

Different molecular weights

Different therapeutic protocols

JOINT LUBRIFICATION
ANABOLIC EFFECT ON CHONDROCYTES
REDUCED OXIDATIVE STRESS

TEMPORARY SYMPTOMS RELIEF

Bellamy N, Campbell J et al: Cochrane database Sys Rev (2006)

NEW BIOLOGICAL SOLUTIONS FOR EARLY OSTEOARTHRITIS

PRP

PROS

- ✓ FASHIONABLE
- ✓ PROMISING
- ✓ LOW INVASIVE

CONS

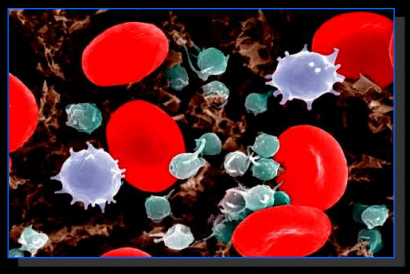
- ✓ MECHANISM OF ACTION?
- ✓ LOW SCIENTIFIC EVIDENCE
- ✓ NO QUALITY CONTROLS
- ✓ NO UNIFORM DESCRIPTION

MORE INVESTIGATION NEEDED

BLOOD DERIVATIVES: P.R.P.

PLATELET-RICH PLASMA IS THE OUTCOME OF A CENTRIFUGATION OF AUTOLOGOUS BLOOD

FIELDS OF APPLICATION



- ✓ ORTHOPEDICS
- ✓ SPORTS MEDICINE
- ✓ DENTISTRY
- ✓ DERMATOLOGY
- ✓ OPHTALMOLOGY
- ✓ PLASTIC AND MAXILLOFACIAL SURGERY
- ✓ COSMETIC, ETC…

OUR EXPERIENCE: RIZZOLI LAB MADE PRP

150-ml venous blood sample

TWICE CENTRIFUGATED

20 ml of PRP produced divided into 4 units of 5 ml.

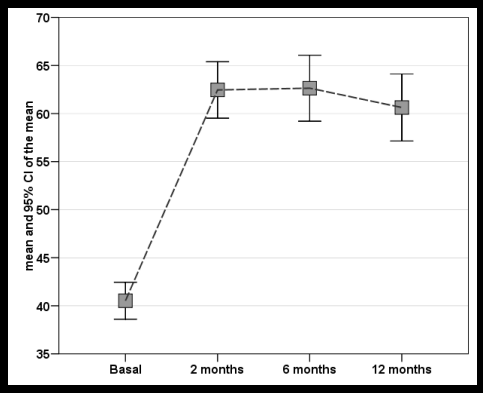
Analysis of platelet concentration and quality test (platelet count and bacteriological test)

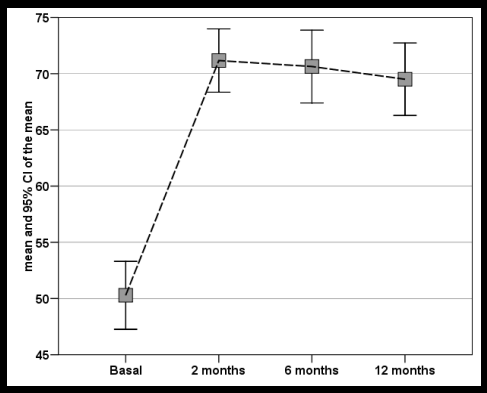
The total number of platelets in the PRP increased of 600% compared with whole blood

PRP – Knee Cartilage Lesions

- **100 patients enrolled, evaluated up to 12 months**
- **50.1 years (24 to 82)**
- **24 bilateral lesions – 115 knee treated**

IKDC SUBJ





EQ VAS

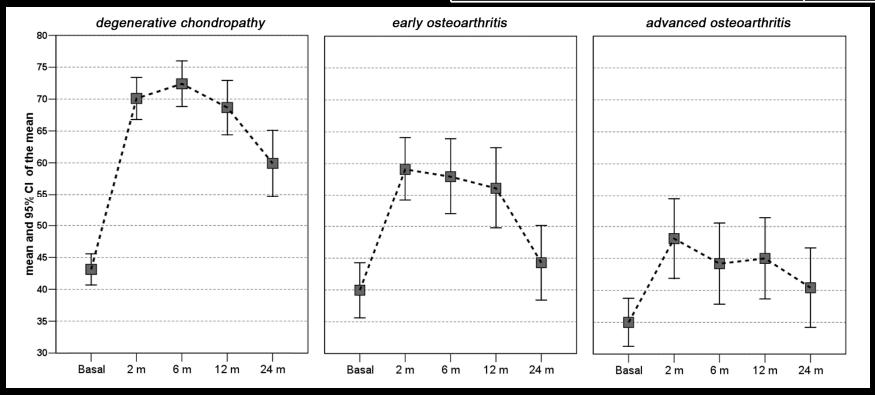
PRP injections reduce pain and improve knee function and quality of live in younger patients with low degree of articular degeneration

Kon E " Platelet-rich plasma: intra-articular knee injections produced favorable results on degenerative cartilage lesions" **(KSSTA, 2009)**

PRP – Knee Cartilage Lesions

DURATION OF EFFECT

PATIENTS	MONTHS (Mean ± SD)
ALL	10.9 ± 8.1
MEN	12.6 ± 7.9
WOMEN	7.8 ± 7.6
DEG CHOND	13.7 ± 7.7
EARLY OA	9.2 ± 6.9
SEVERE OA	6.1 ± 7.8



OUTCOME AND CARTILAGE DEG. GRADE

G. Filardo, E. Kon, R. Buda, et al "Platelet-rich plasma intra-articular knee injections for the treatment of degenerative cartilage lesions and osteoarthritis." . (KSSTA, 2010)

COMPARATIVE STUDY

PATIENT SELECTION: 3 homogeneous groups

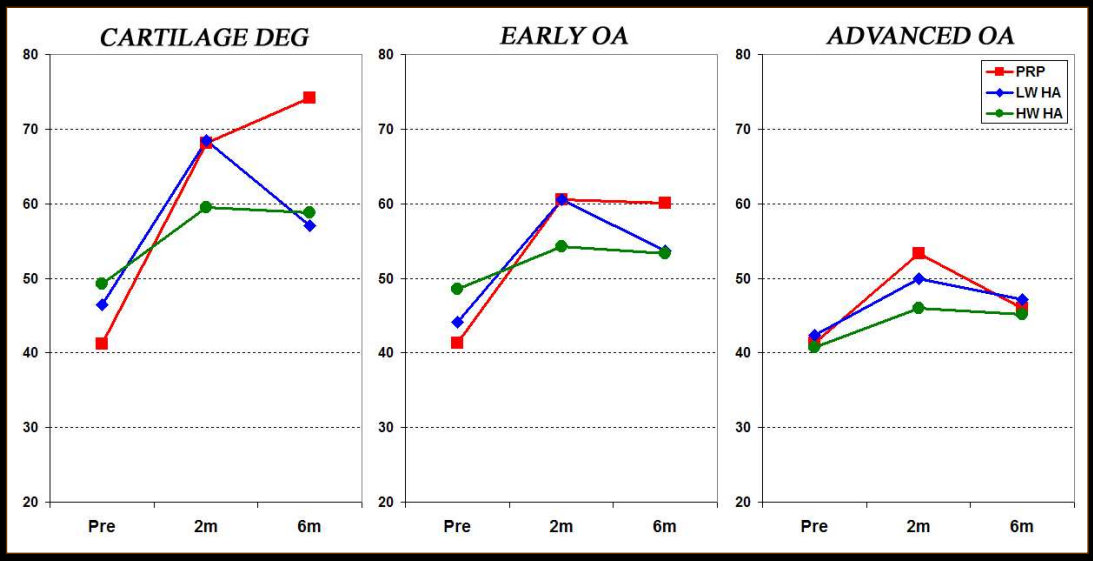
50 patients - PRP
50 patients - Low Molecular Weight HA
50 patients - High Molecular Weight HA

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 E, Mandelbaum B et al.: Platelet-Rich Plasma Intra-Articular Injection Versus HA Viscosupplementation as Treatments for Cartilage Pathology: From Early Degeneration to Osteoarthritis. Arthroscopy 2011

DEGENERATION RELATED RESULTS



SIMILAR RESULTS AT 2 m FOR PRP AND LW HA

WORST RESULTS FOR HIGHER DEGREE OF KNEE DEGENERATION FOR ALL TREATMENTS

NO STRONG SCIENTIFIC EVIDENCE
ABOUT NOVEL APPROACHES:

FURTHER STUDIED NEEDED TO….

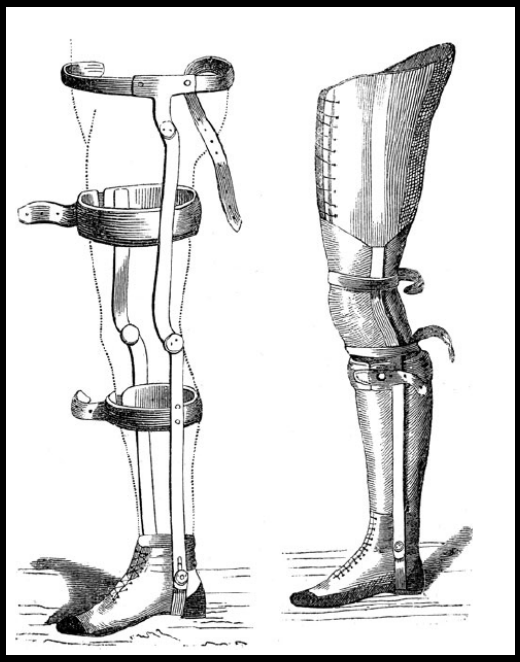
1. **CLARIFY CLINICAL INDICATIONS**
2. **DEFINE BEST PREPARATION METHODS AND BIOLOGICAL PROPERTIES**
3. **DEFINE BEST THERAPEUTIC PROTOCOLS**
4. **….**

NEW SUBSTANCE

LUBRICIN ?

CONSERVATIVE MANAGEMENT

BRACES AND INSOLES



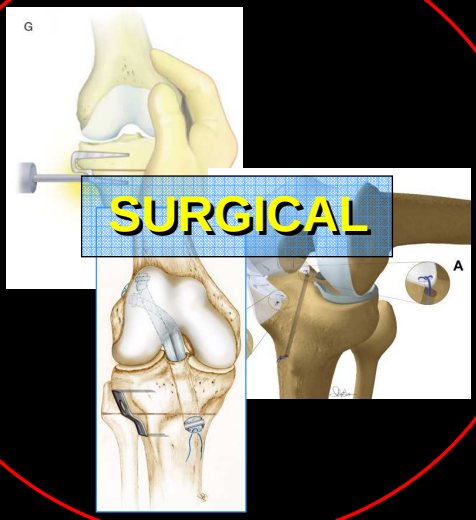
CONSERVATIVE MANAGEMENT

BRACES AND INSOLES

TO MECHANICALLY UNLOAD THE AFFECTED MEDIAL COMPARTMENT

MANAGEMENT OF VARUS KNEE

CONSERVATIVE



SURGICAL

MENISCECTOMY AND VARUS ALIGNMENT

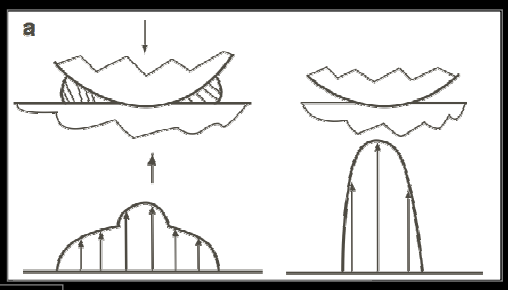
…OFTEN VARUS ALIGMENT AND MEDIAL OA ARE ASSOCIATED TO MENISCAL DEFICIT

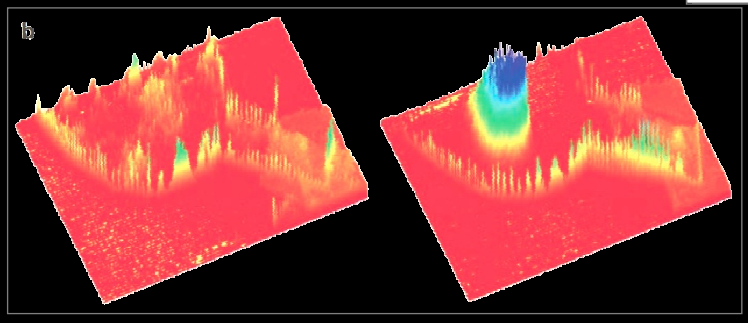
CORRECTIVE OSTEOTOMY COULD NOT BE ENOUGH TO IMPROVE SYMPTOMS AND DELAY OA PROGRESSION…

MENISCAL SUBSTITUTION

MENISCECTOMY
Contact Areas – Contact Stresses

a: Contact areas decrease and contact stresses increase following meniscectomy.

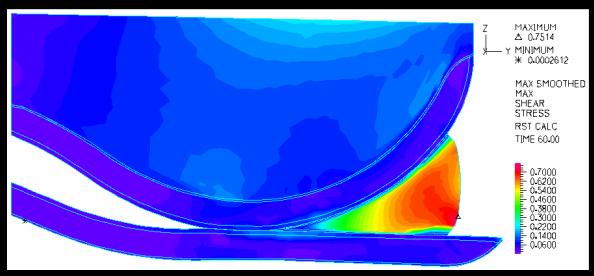




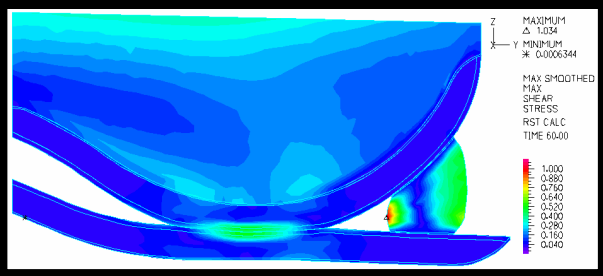
b: Contact pressures in the lateral compartment before and after meniscectomy.

McDermott ID et al - Effects of lateral meniscal allograft transplantation techniques on tibio-femoral contact pressures.
Knee Surg Sports Traumatol Arthrosc 16:553–560 (2008)

MENISCECTOMY
Shear Stress Distribution



Maximum shear stress contour of axisymmetric knee joint
with full meniscus



Maximum shear stress contour of axisymmetric knee joint
with 65% meniscectomy

Finite element modeling following partial meniscectomy: Effect of various size of resection
Sharadsinh P. Vadher et al - 28th IEEE EMBS Annual International Conference
New York City, USA, Aug 30-Sept 3, 2006

MENISCECTOMY AND VARUS ALIGNMENT

1.7° VARUS INCREASED AFTER 5 YEARS FROM MEDIAL MENISCECTOMY

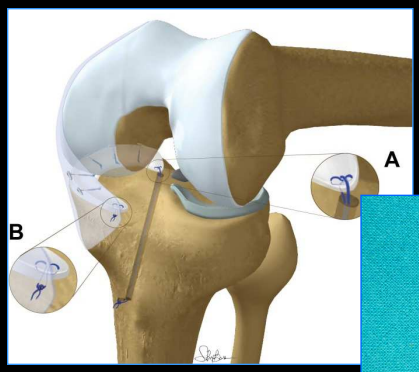
Related factors	β values	*p* values
Sex	0.131	n.s.
Age	−0.078	n.s.
Body mass index	−0.006	n.s.
Preoperative alignment	0.102	n.s.
Resection amount	0.528	0.002*
Cartilage injury	0.008	n.s.
Follow-up duration	−0.136	n.s.

n.s. not significant
* statistical significant

RESECTION AMOUNT AS PREDICTOR OF VARUS PROGRESSION

Yoon KSSTA 2013

MENISCAL REPLACEMENT



ALLOGRAFT

SCAFFOLD

PROS	CONS
TISSUE QUALITY	STERILIZATION
BIOMECHANICS	DISEASE TRASMISSION
GRAFT STABILITY	SURGICAL TECHNIQUE
	SIZING (MRI-XRAY)

PROS	CONS
SAFETY	TISSUE MATURATION
SURGICAL TECHINIQUE	TISSUE QUALITY
AVAILABILITY	
SIZING	

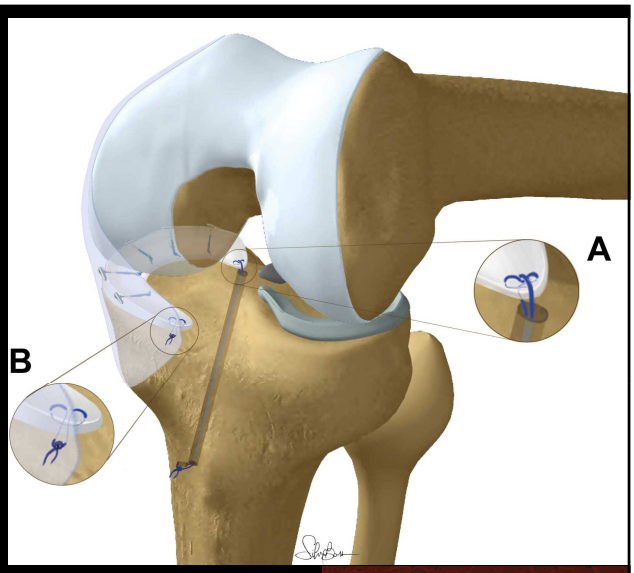
DIFFERENT SURGICAL INDICATION

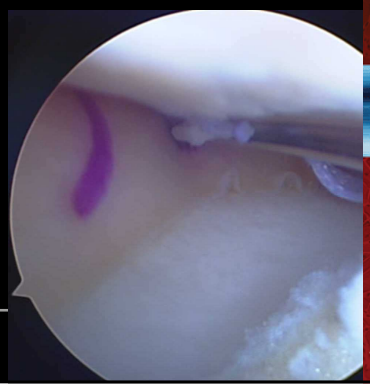
MENISCAL ALLOGRAFT

NEW ARTHROSCOPIC TECHNIQUE

- ✓ ALL-INSIDE PERIPHERAL SUTURING TECHNIQUE (fast-fix)
- ✓ ONLY ONE TIBIAL TUNNEL TO FIX POSTERIOR HORN
- ✓ SUTURE for DYNAMIC ANTERIOR HORN FIXATION
- ✓ SUFFICENT STABILITY

Marcacci, Zaffagnini, et al, AJSM 2012





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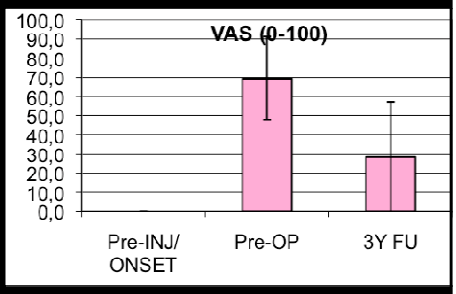
RESULTS

- PAIN REDUCTION

- BETTER KNEE FUNCTION

- PROTECTIVE EFFECT ON CARTILAGE (MRI EVAL.)



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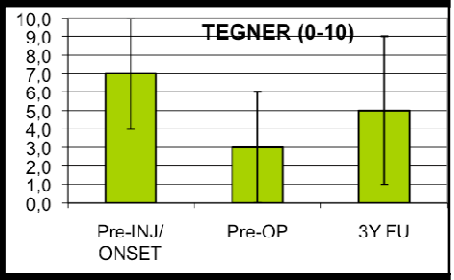

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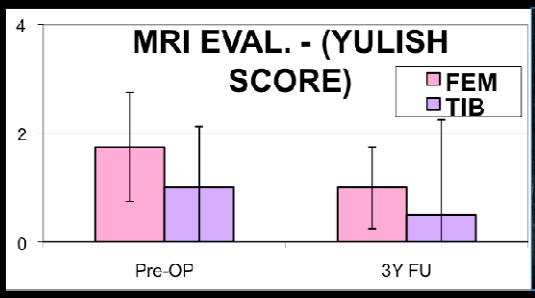

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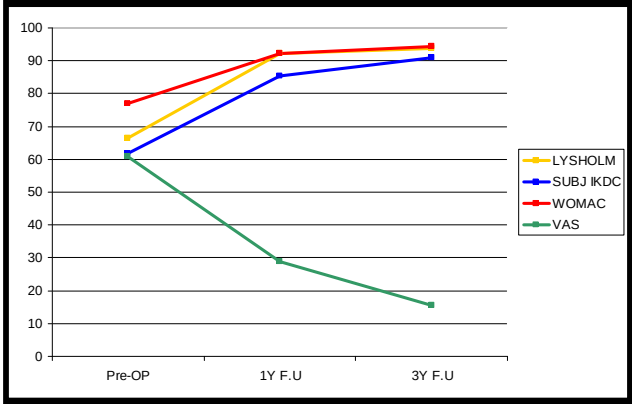
ARTHROSCOPIC MAT IN PORFESSIONAL SOCCER PLAYERS

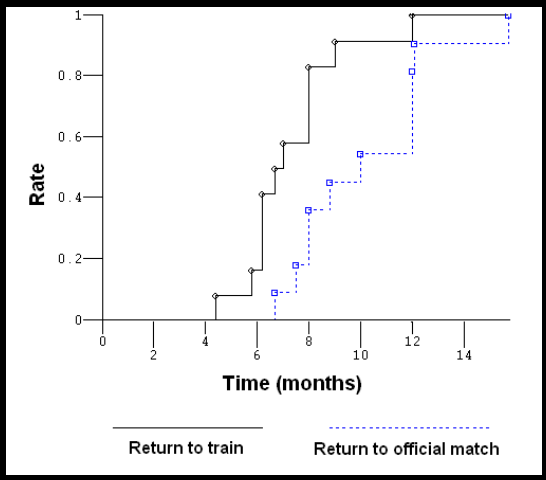


P < 0.05

- PAIN REDUCTION
- BETTER KNEE FUNCTION

- 67% TEGNER 10 AT 12 MONTHS
- 75% TEGENR 10 AT 36 MONTHS

- RETURN TO TRAIN: 7.5 **± 2.0** MONTHS
- RETURN TO MATCH: 10.5 **± 2.6 MONTHS**



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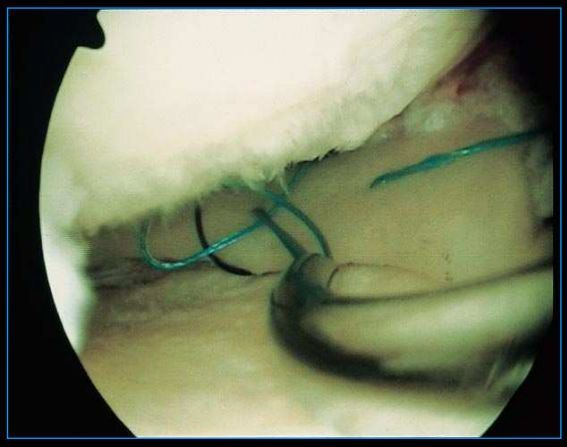
Zaffagnini AJSM 2013

COLLAGEN TYPE I SCAFFOLD
CMI EXPERIENCE FROM 1996



MATERIALS and METHOD

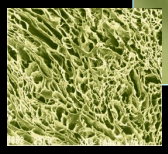
Prospective Long-Term Outcomes of the Medial Collagen Meniscus Implant Versus Partial Medial Meniscectomy

A Minimum 10-Year Follow-Up Study

	MCMI (N = 17)		**PMM** (N = 16)	
	acute	chronic	acute	chronic
Patients enrolled	8	10	10	8
Patients evaluated	7	10	10	6
Follow-up time (months)				
range	120-152		122-145	
mean	135		130	
Age (years)				
range	24-60		28-60	
mean	38		44	
Sex	all males		all males	
Body Mass Index				
mean at surg.	25,24		26,03	
SD	1,65		1,88	
mean at last FU	26,15		27,28	
SD	3,23		3,30	

CMI

(BOVINE TYPE-I COLLAGEN SCAFFOLD)

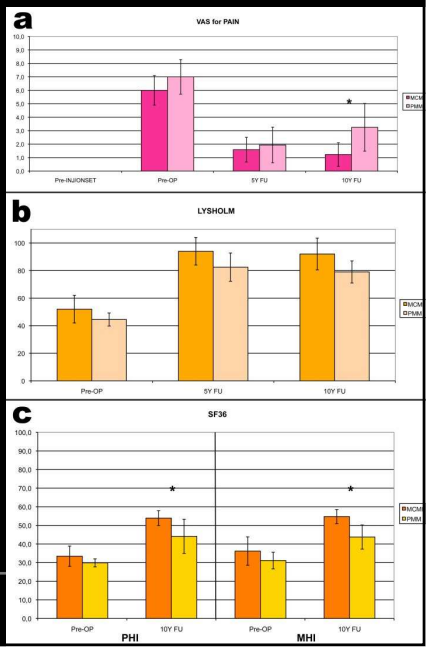


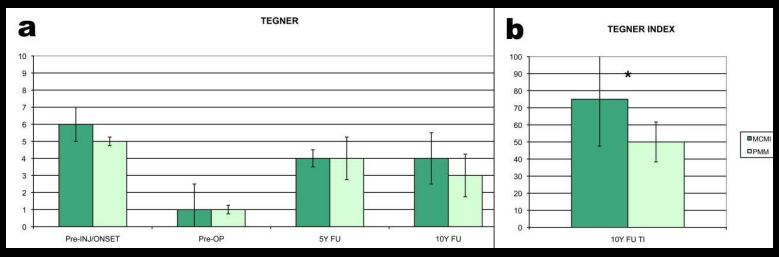
Zaffagnini, Marcacci, et al, AJSM 2011

RESULTS

MEDIAL CMI vs PARTIAL MEDIAL MENISCECTOMY 10 YEARS MIN F.U.

- ✓ **REDUCED PAIN**
- ✓ **BETTER SF-36**
- ✓ **REGAINED TEGNER ACITVITY**

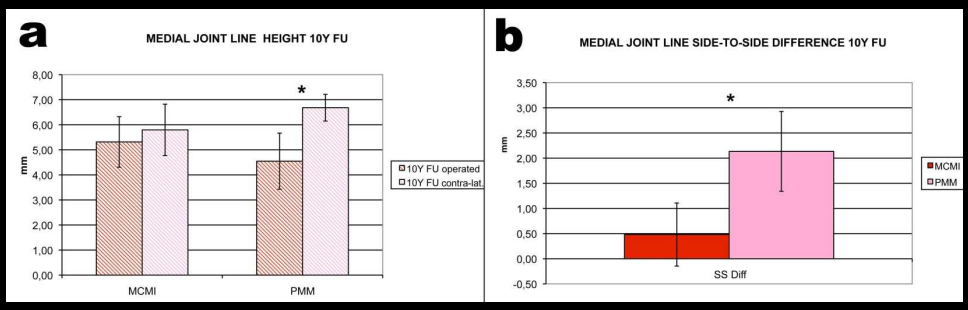




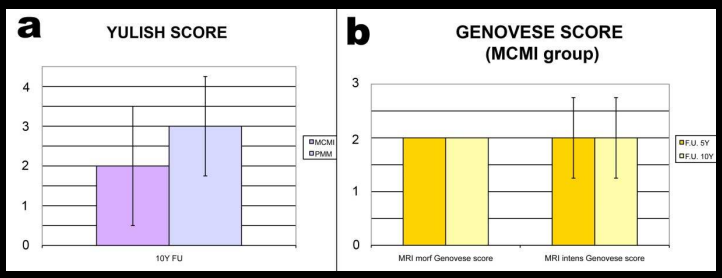
RESULTS

MEDIAL CMI vs PARTIAL MEDIAL MENISCECTOMY 10 YEARS MIN F.U.

X-RAY
med. joint-line



MRI

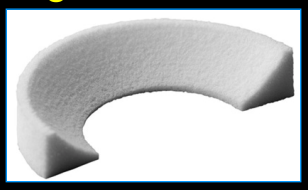


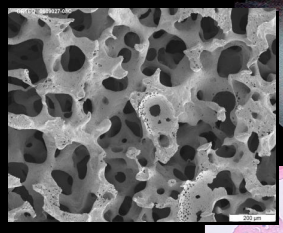
NEW SYNTHETIC SCAFFOLD

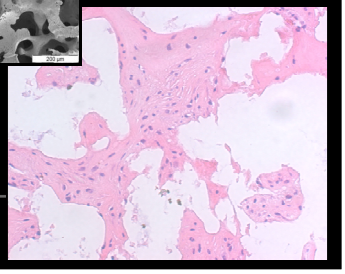
POLYURETHANE SCAFFOLD

ACTIfit™

- ✓ **Safety and Feasibility trial finished in Europe (N=49)**
- ✓ **CE mark**
- ✓ **slowly degradable scaffold**
- ✓ **preliminary results**
- ✓ **implantable and biocompatible**
- ✓ **supports new tissue ingrowth and regeneration**







Van Tienen et al. Biomaterials 2002
Van Tienen et al. Biomed Mater Res 2006
Huysse W et al. ESSKA 2008
Verdonk R et al. ESSKA 2008

SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Istituto Ortopedico Rizzoli di Bologna
Istituto di Ricovero e Cura a Carattere Scientifico

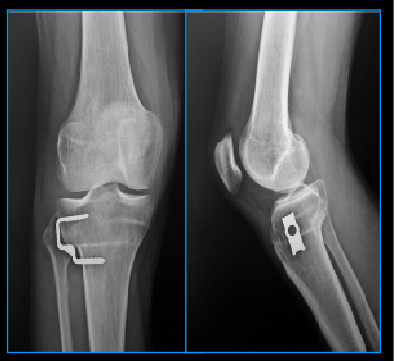
TECHNIQUE

ARTHROSCOPIC TECHNIQUE

ALWAYS REMEMBER

MECHANICAL ALIGNMENT

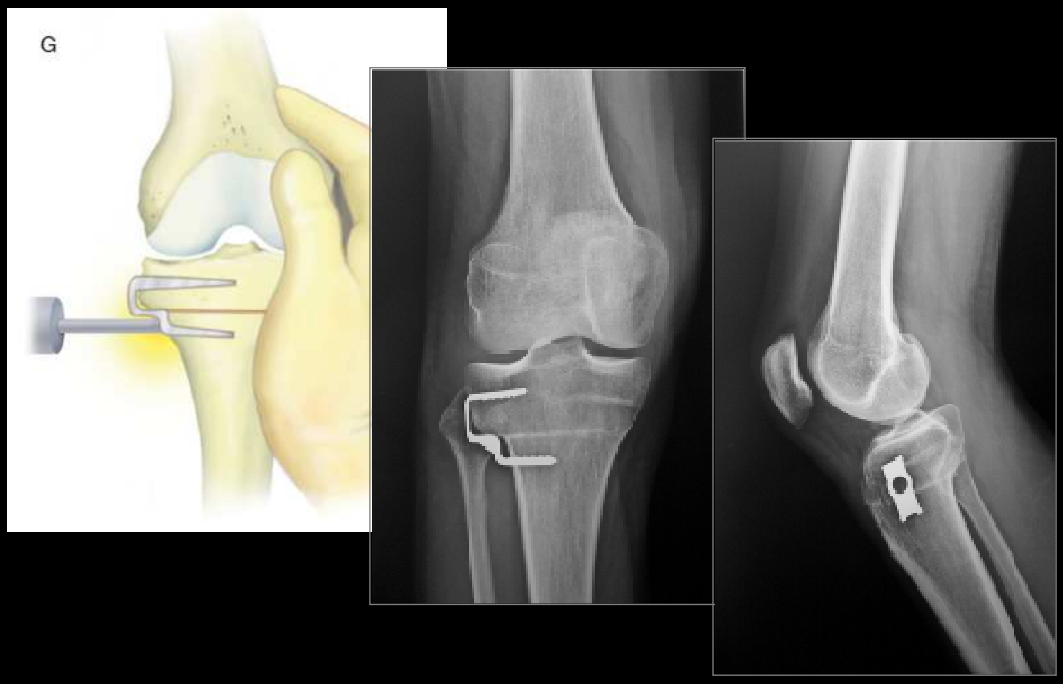
IF MORE THAN 3° VARUS OR VALGUS



SHOULD BE CORRECTED TO NEUTRAL

NO OVERCORRECTION IN THIS CASES

TIBIAL OSTEOTOMY



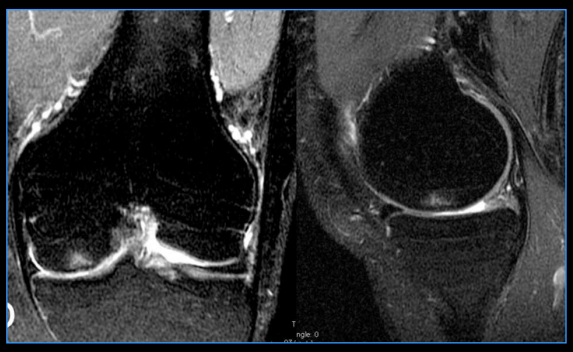
IDEAL CANDIDATE

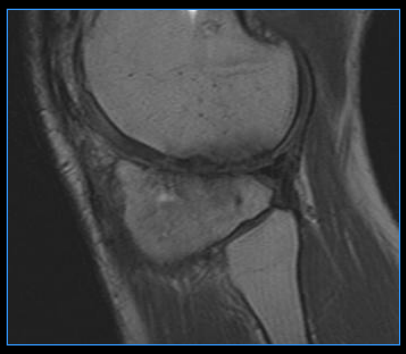
- ✓ < 60 YEARS
- ✓ ISOLATED MEDIAL OA
- ✓ GOOD ROM
- ✓ NO LIGAMENTOUS INSTABILITY

YOUNG PATIENT WITH OLD KNEE

CLINICAL EXAMINATION IS THE KEY

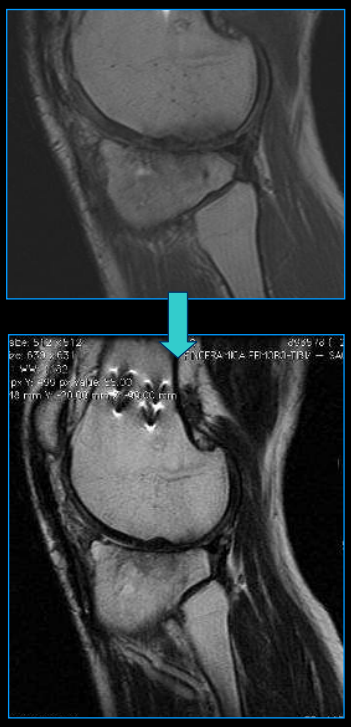
- ✓ ASSESS ALIGNMENT IN ALL THREE PLANES
- ✓ OBSERVE GAIT TO DETECT VARUS THRUST
- ✓ CHECK STABILITY
- ✓ EVALUATE ROM AND FLEXION CONTRACTURE
- ✓ EXAMINE PF JOINT
- ✓ OBTAIN AN MRI





OSTEOTOMY EFFECTS

- ✓ UNLOAD THE AFFECTED COMPARTMENT
- ✓ CREATE AN OPTIMAL ENVIRONMENT FOR SUBCHONDRAL AND CARTILAGE REGENERATION/REPAIR
- ✓ STABILIZE THE JOINT
- ✓ PROTECT THE MENISCUS



Available online at www.sciencedirect.com
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The Knee 10 (2003) 229–236
THE KNEE
www.elsevier.com/locate/knee

Regeneration of degenerated articular cartilage after high tibial valgus osteotomy for medial compartmental osteoarthritis of the knee

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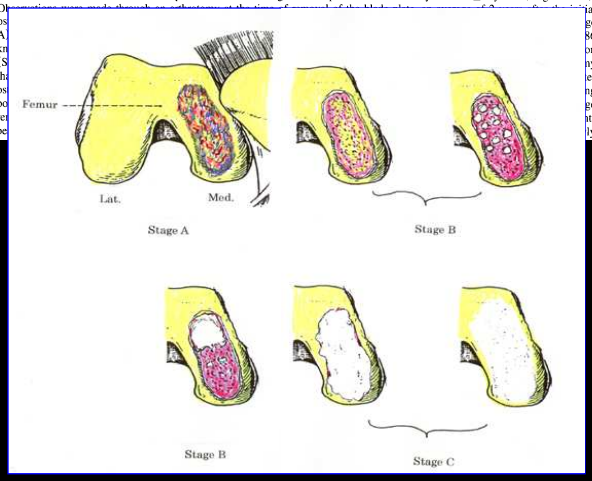
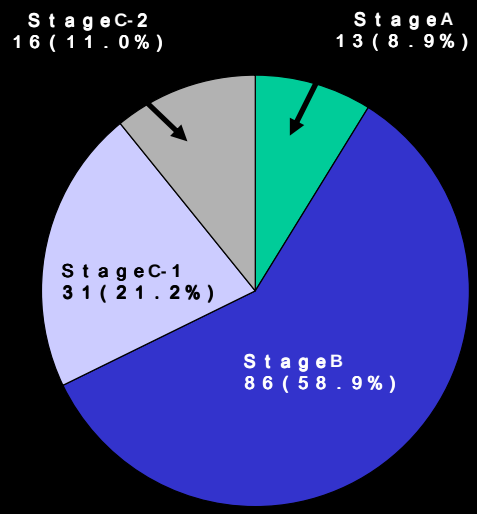
Received 3 October 2002; received in revised form 3 October 2002; accepted 12 December 2002

Abstract

The aim of the current study was to document regeneration of the articular cartilage after correction of varus deformity for osteoarthritis of the knee. The repair of articular cartilage after high tibial valgus osteotomy for medial compartmental osteoarthritis was observed in 146 knees of 115 patients. The mean age of the patients at osteotomy was 65 ± 7 years (range 47–80).





146 knees

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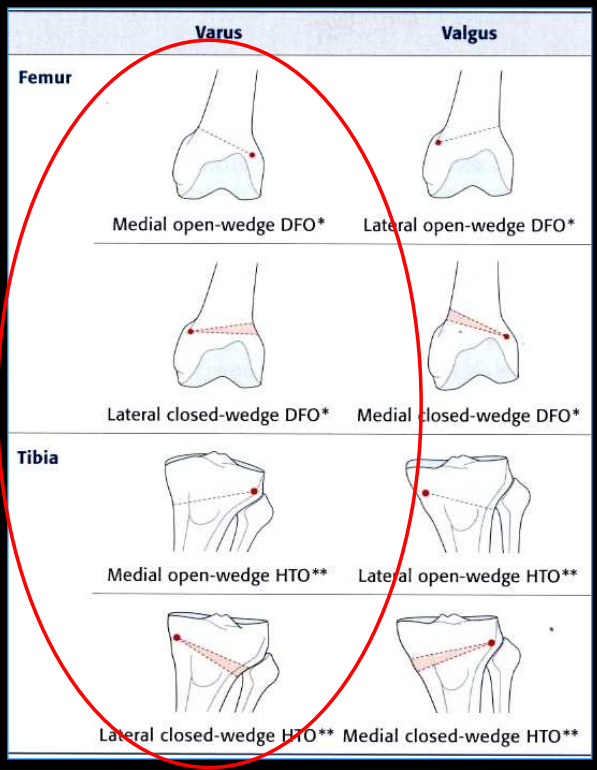
OSTEOTOMY TYPE

CHOICE DEPENDS ON

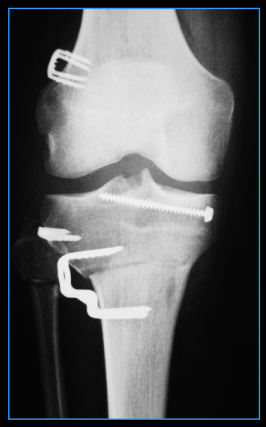
- ✓ CORRECTION REQUIRED
- ✓ **ARTHRITIS STAGE**
- ✓ LIGAMENTOUS INSTABILITY
- ✓ PRE-OPERATIVE LEG LENGTH
- ✓ **WEIGHT**
- ✓ **AGE, ACTIVITY LEVEL**
- ✓ **TIBIAL OR FEMORAL TORSION**
- ✓ SURGEON PREFERENCE



Jacobi et al. in "Osteotomies Around the Knee" 2008

INTRODUCTION

COMBINED PROCEDURE



Cole 2005
Verdonk 2005
Rodeo 2009

MAT

+

LIGAMENT(S) REC.

CARTILAGE

OSTEOTOMY

BIOLOGICAL PROSTHESIS

COMBINED PROCEDURES

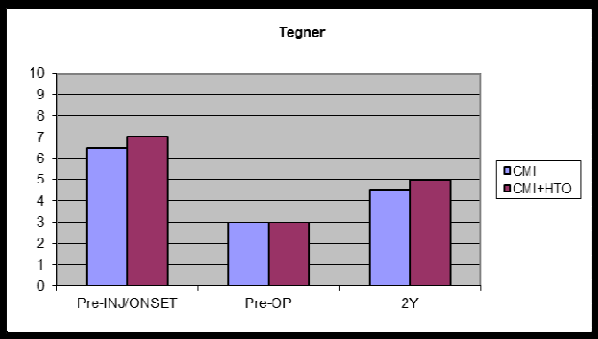
MOST FREQUENTLY PERFORMED TO TREAT COMORBIDITIES THAT MAY COEXIST IN THE SETTING OF MENISCAL TRANSPLANTATION

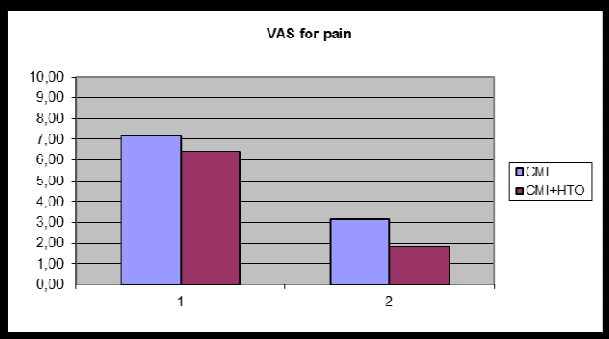
- ✓ **OSTEOTOMY**
- ✓ **LIGAMENT RECONSTRUCTION**
- ✓ **CARTILAGE RESURFACING PROCEDURE**

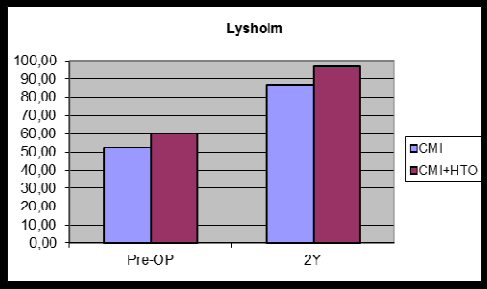
Rodeo 2009
Cole 2005
Verdonk 2005

CMI + OSTEOTOMY

HTO+CMI *vs* CMI







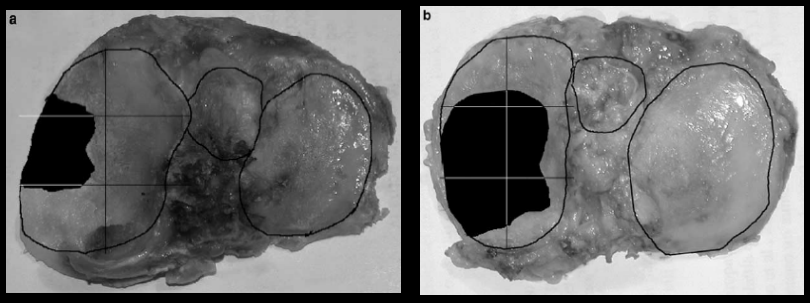
NO STAT. SIGNIF. DIFF.

after 24 months

VARUS MALALIGMENT AND ACL

SEVERE CARTILAGE LESION IN:

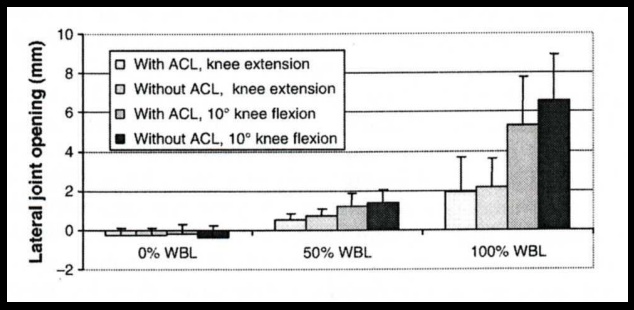
- ✓ SEVERE VARUS ALIGNMENT
- ✓ ANTERIOR CRUCIATE LIGAMENT DEFICIENCY



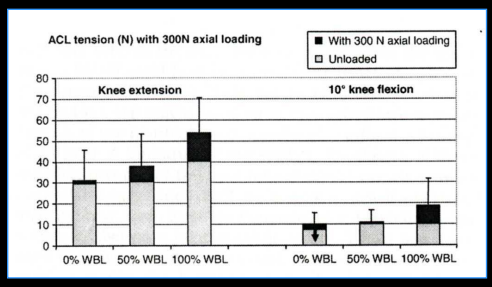
Moschella Clin Biomec 2006

VARUS MALALIGMENT AND ACL

LAT JOINT OPENING INCREASES JUST FOR SEVERE VARUS DEFORMITY



TENSION ON ACL INCREASES AS VARUS DEFORMITY INCREASES

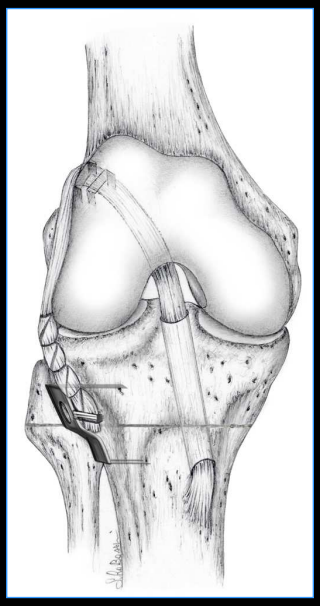


VARUS THRUST: INDICATION FOR COMBINED PROCEDURE

Van De Pol AJSM 2009

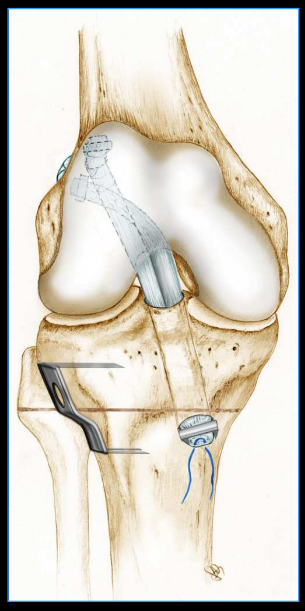
COMBINED CLOSING WEDGE + ACL RECONTRUCTION

HAMSTRING



+

ALLOGRFT

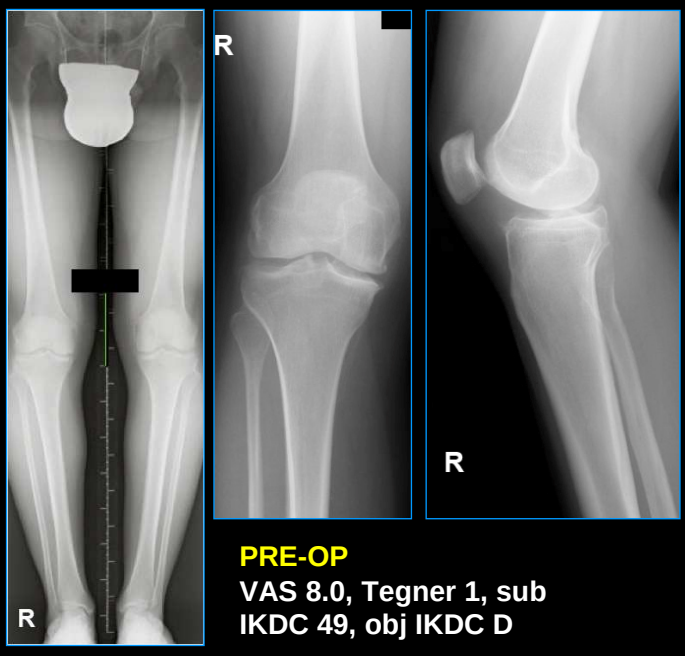


COMBINED PROCEDURES

CASE

PZ ♂ 48 y PAIN IN VARUS KNEE 8 YRS AFTER MED. MENISCECTOMY

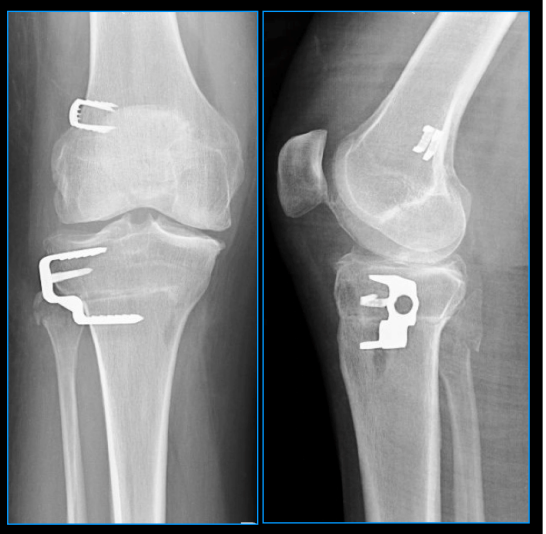
ACL RUPTURE 1 YRS AGO



PRE-OP

VAS 8.0, Tegner 1, sub

IKDC 49, obj IKDC D



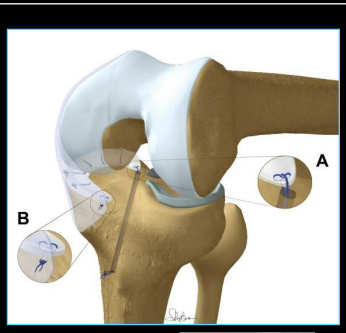
F.U. 12 months

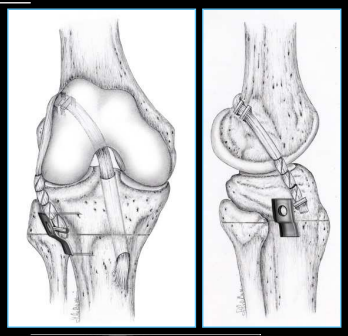
VAS 2.0 , Tegner 4, subj

IKDC 79, obj IKDC A

COMBINED PROCEDURES

CASE





Marcacci et al
AJSM 2012

Zaffagnini et al
KSSTA 2013

SURGICAL STEPS

1st arthroscopic medial Meniscus Allograft Transplantation
2nd autologous Gr/St ACL rec. (over-the-top + lateral plasty)
3rd lateral closing wedge HTO
4th **fixation** (HTO and after ACL reconstruction)

RESULTS

- IMPROVEMENT OF KNEE FUNCTION
- PAIN REDUCTION
- STABLE KNEE IN 97%
- GOOD ACTIVITY LEVEL

Table 2 Clinical outcome scores

Score	Evaluation				*p* values
	Pre-operative		Final follow-up		
Subjective IKDC	58.0	±12.2	72.0	±16.5	<0.0001*
WOMAC	68.2	±13.2	82.6	±11.6	<0.0001*
VAS	73.2	±12.0	42.1	±25.2	<0.0001*
Tegner activity level	3	2–4	5	4–5	=0.0012*
EQ-5D	0.620	±0.230	0.892	±0.140	<0.0001*

* Significant values ($p < 0.05$)

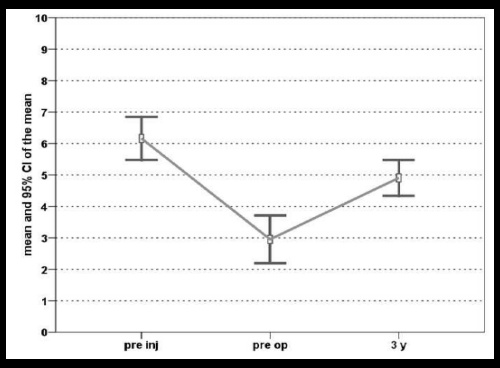
KT

INDEX SIDE	OPP SIDE	Δ
7.9±2.4	5.7±1.3	2.2±1.1

CARTILAGE RESTORATION

COMBINED PROCEDURES

UNICOMPARTMENTAL OSTEOARTHRITIS:
AN INTEGRATED BIOMECHANICAL AND BIOLOGICAL APPROACH
AS ALTERNATIVE TO METAL RESURFACING.
A 3-YEAR FOLLOW-UP STUDY.



Tegner Score trend

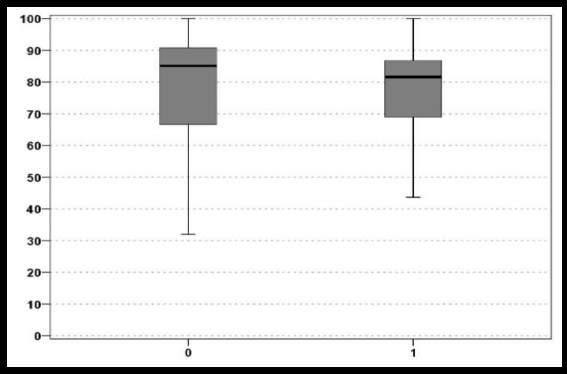
IKDC subjective score:
from 47.3 to 79.6 (p<0.0005)

VAS : from 6.1 to 2.3 (p<0.0005)

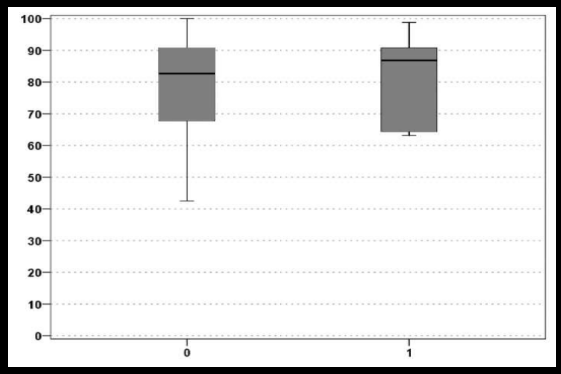
TEGNER score:
from 2 (1-5) to 4 (3-10) (p<0.0005)
even if without achieving the pre-injury level (6, p=0.0001)

Marcacci, Zaffagnini, Kon, et al KSSTA 2013 in press

COMBINED PROCEDURES



IKDC subjective score with (number 1) without (number 0) combined osteotomy



IKDC subjective score with (number 1) without (number 0) combined cartilage, meniscal and axial alignment

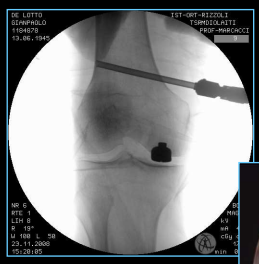
Marcacci, Zaffagnini, Kon, et al KSSTA 2013 in press

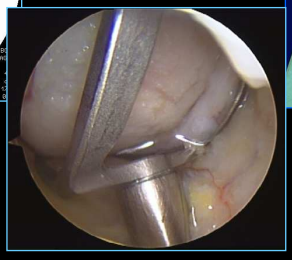
UNICOMPARTMENTAL KNEE ARTHROPLASTY

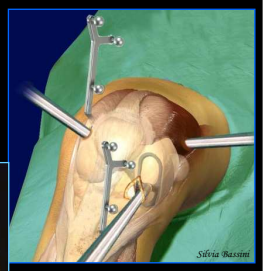
...WHEN BIOLOGICAL APPROACH FAILS

FUTURE SOLUTIONS

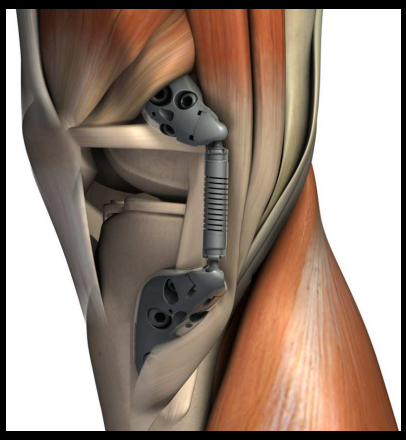
- ✓ NEW PROSTHETIC DESIGN
- ✓ ARTHROSCOPIC UNICONDILAR RESURFACING
- ✓ BIOLOGICAL SUBSTITUTION
- ✓ TISSUE REPLACEMENT

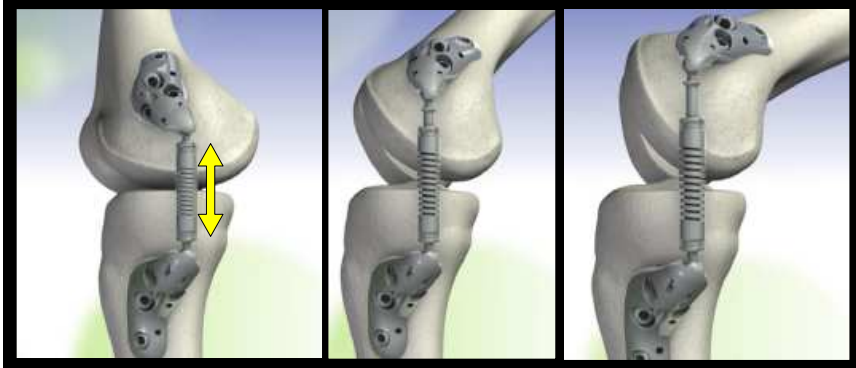






The KineSpring® System



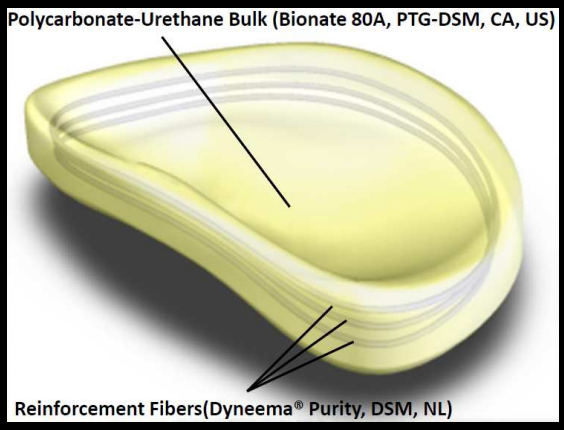


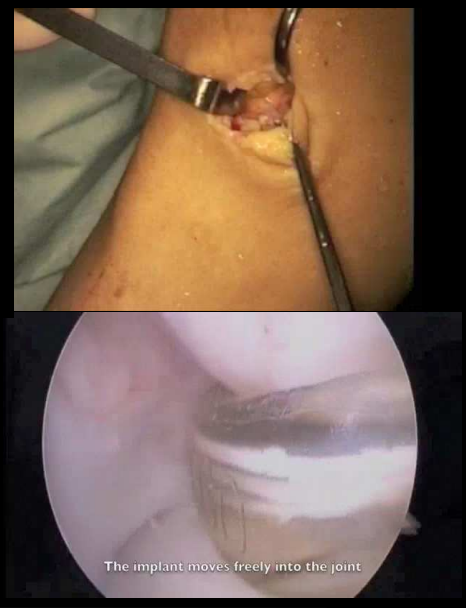
- IMPLANTABLE LOAD ABSORBER FOR THE MEDIAL COMPARTMENT OF THE KNEE
- PARTIAL JOINT UNLOADING
- AIM: RELIVE PAIN, IMPROVE FUNCTION, POTENTIALLY DELAY ARTHROPLASTY

Clifford et al., Medical Devices: Evidence and Research. 2013:6. 69-76

NUsurface®: The Device

•***The design:*** ➢composite construct made of polycarbonate-urethane and cicumferentially reinforced with ultra high molecular weight poly-ethylene fibers





Courtesy of Dott. C. Zorzi, V. Condello

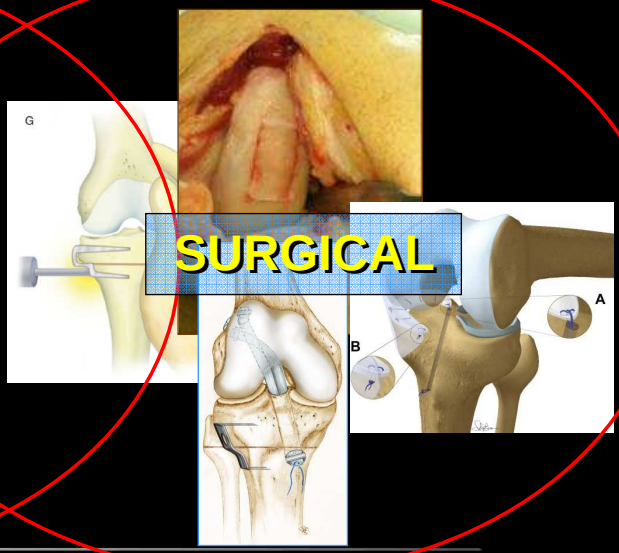
FACTORS AFFECTING RESULTS

- ✓ AGE
- ✓ VARUS DEGREE
- ✓ GLOBAL DEGENERATIVE CHANGES
- ✓ ACTIVITY LEVEL
- ✓ PATIENT COMPLIANCE
- ✓ GENETIC FACTORS ??

KEY FACTORS TO OBTAIN SATISFACTORY RESULTS

COMBINED **THERAPEUTIC MODALITIES**

CONSERVATIVE



SURGICAL

ISTITUTO ORTOPEDICO RIZZOLI

II CLINICA ORTOPEDICA

THANK YOU

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Graphics Silvia Bassini

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