



Ortopedia FMRP-USP  
Cirurgia do Joelho  
Cirurgia do Trauma Ortopédico



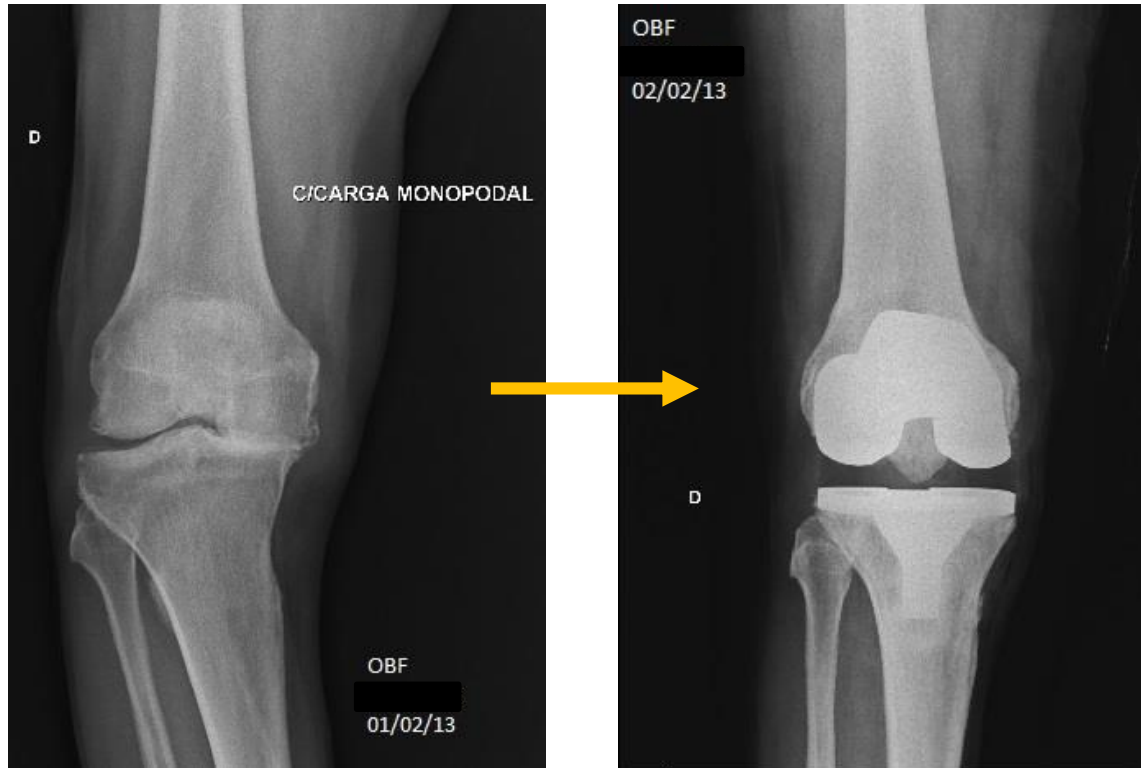
# Artroplastias de Joelho

**Aline Miranda Ferreira**

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Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto  
Universidade de São Paulo

# Artroplastia Total do Joelho (ATJ)

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- Tratamento eficaz para casos de OAJ avançada
- 2030: 3,48 mi/ano de ATJ nos EUA.

(KURTZ et al, 2007)

# Artroplastia Total de Joelho

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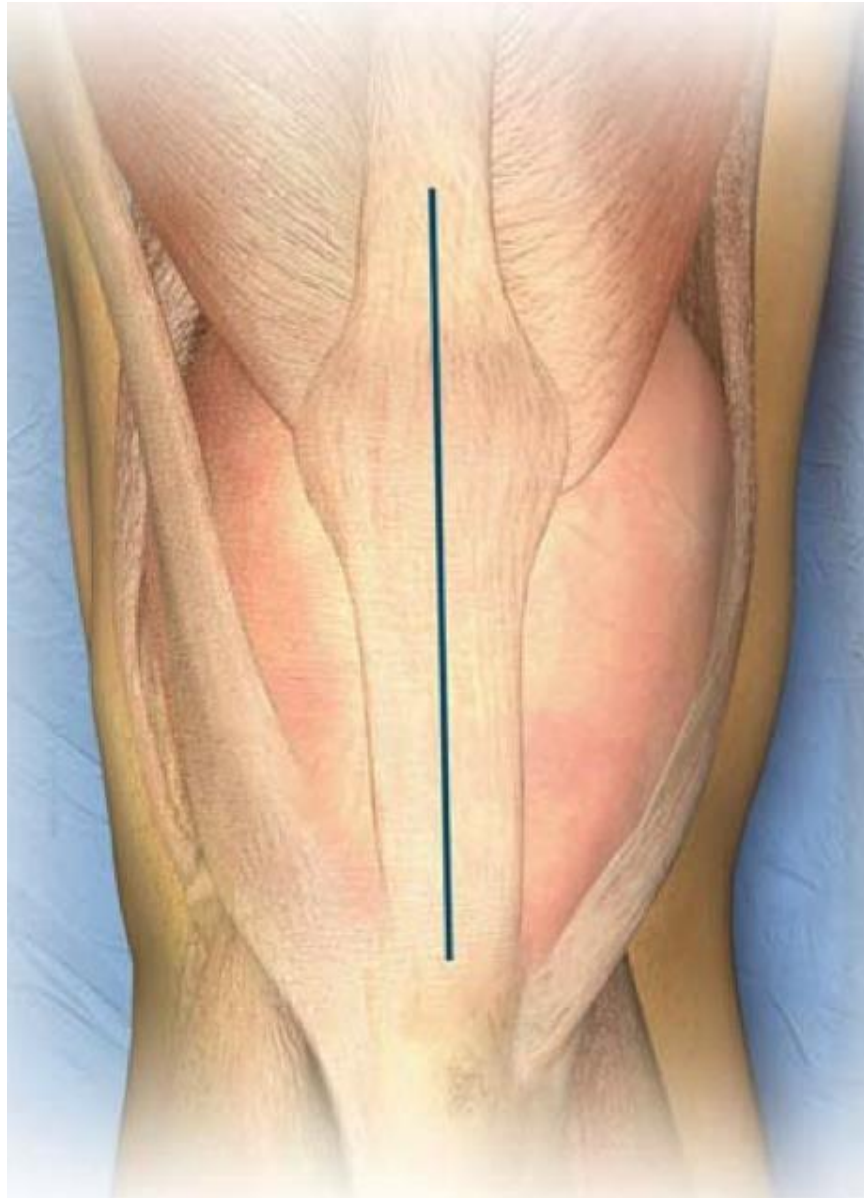


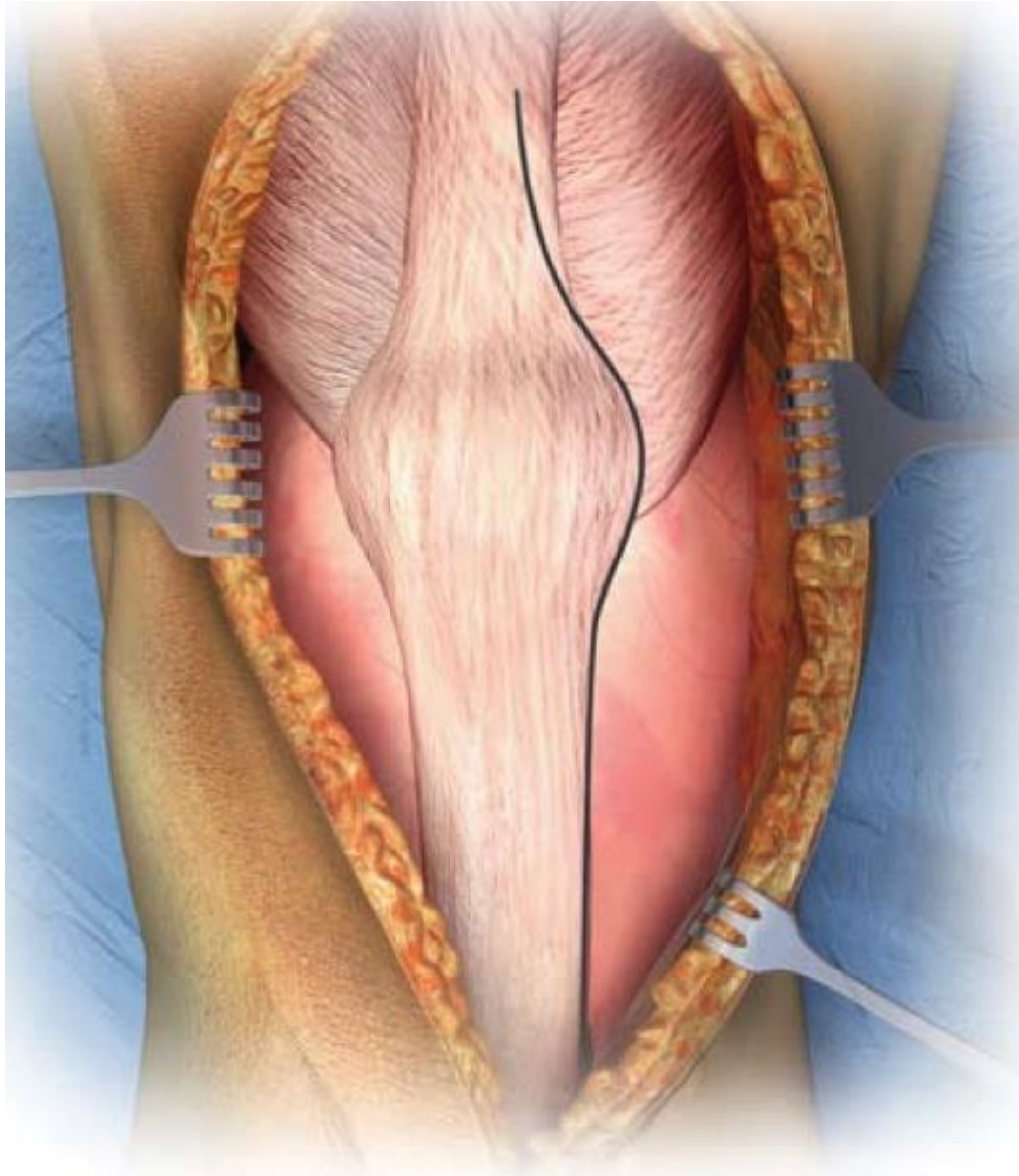
# Artroplastia parcial de joelho

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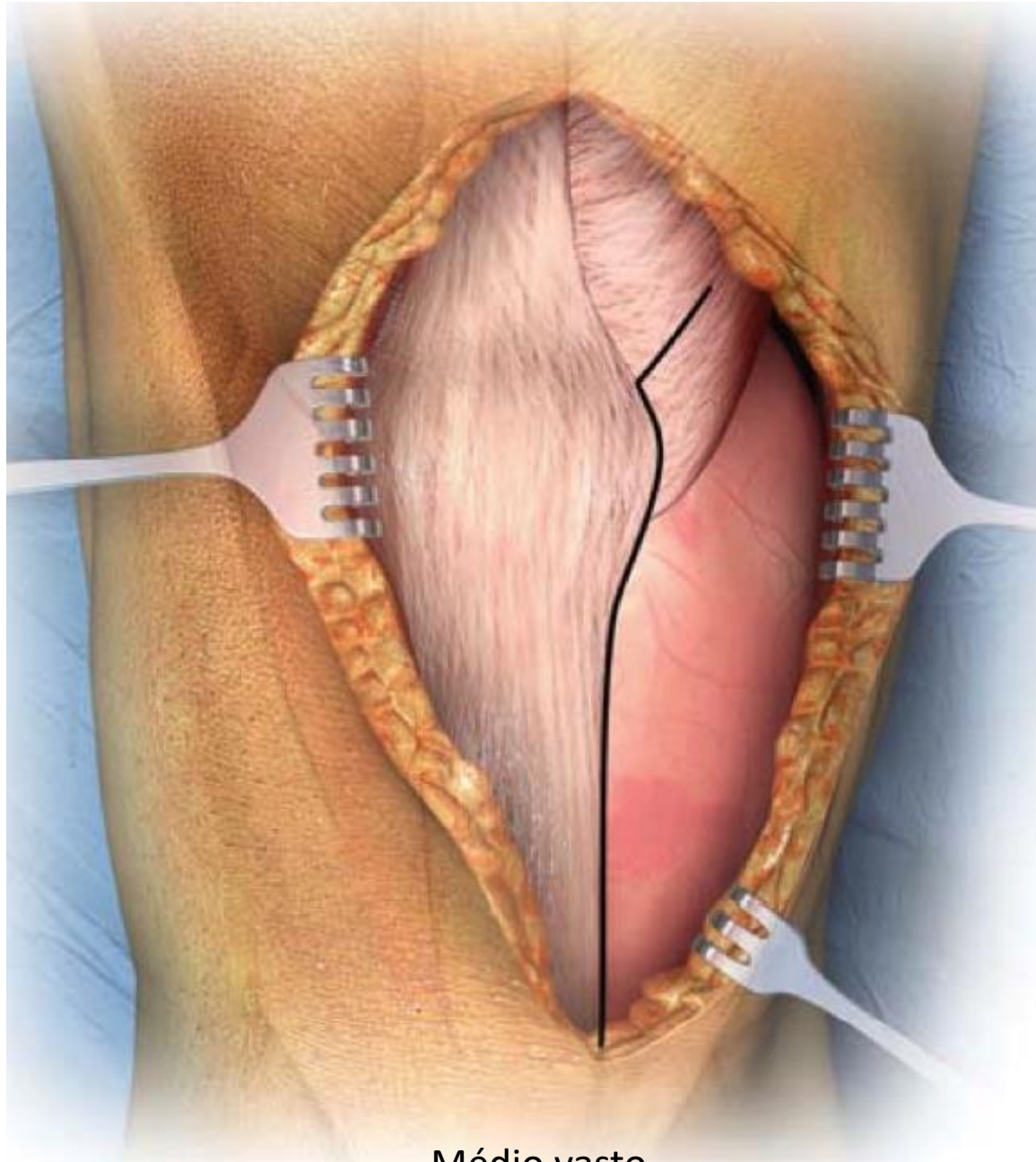


**Via de Acesso Anterior**



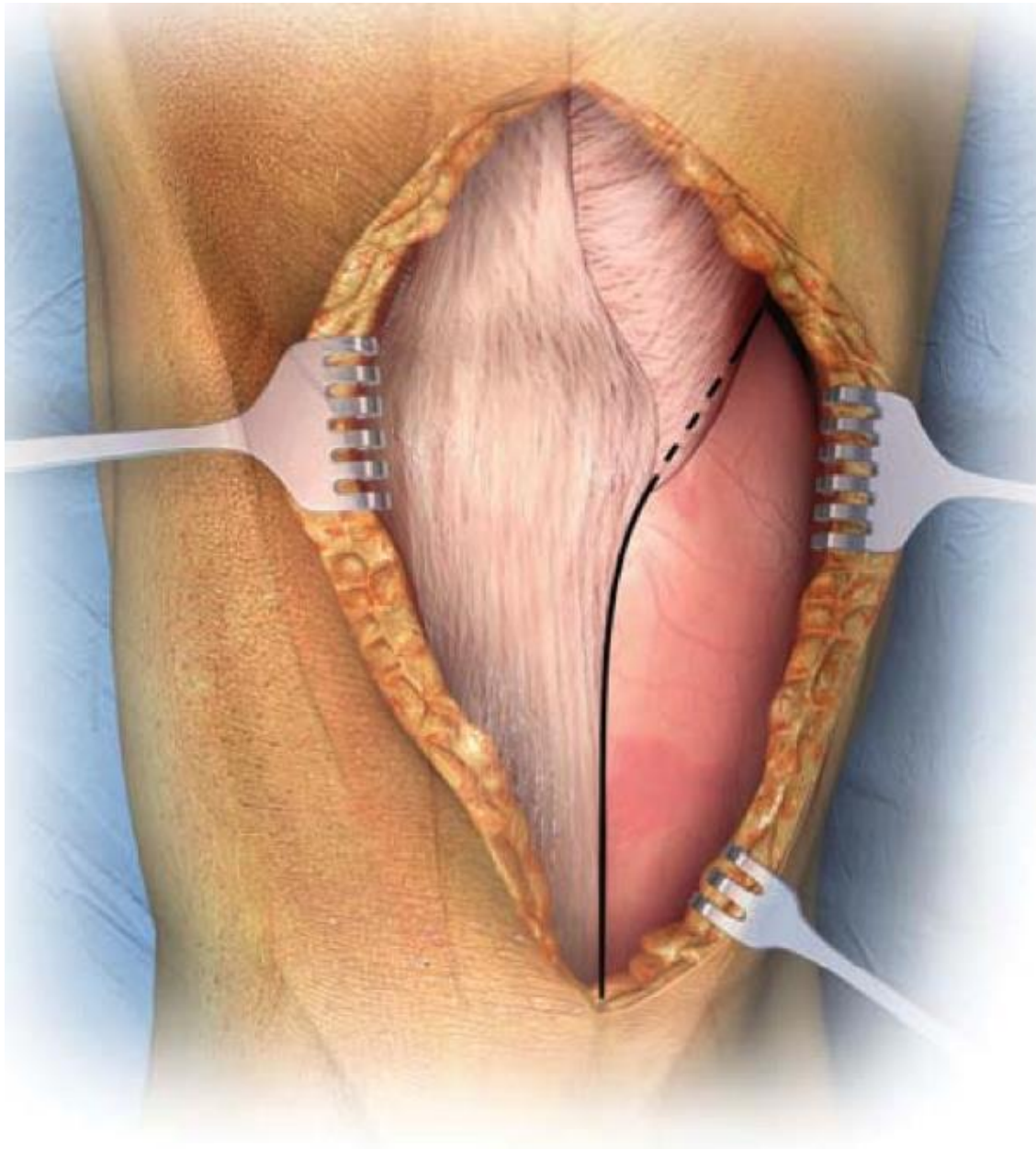


Parapatelar medial



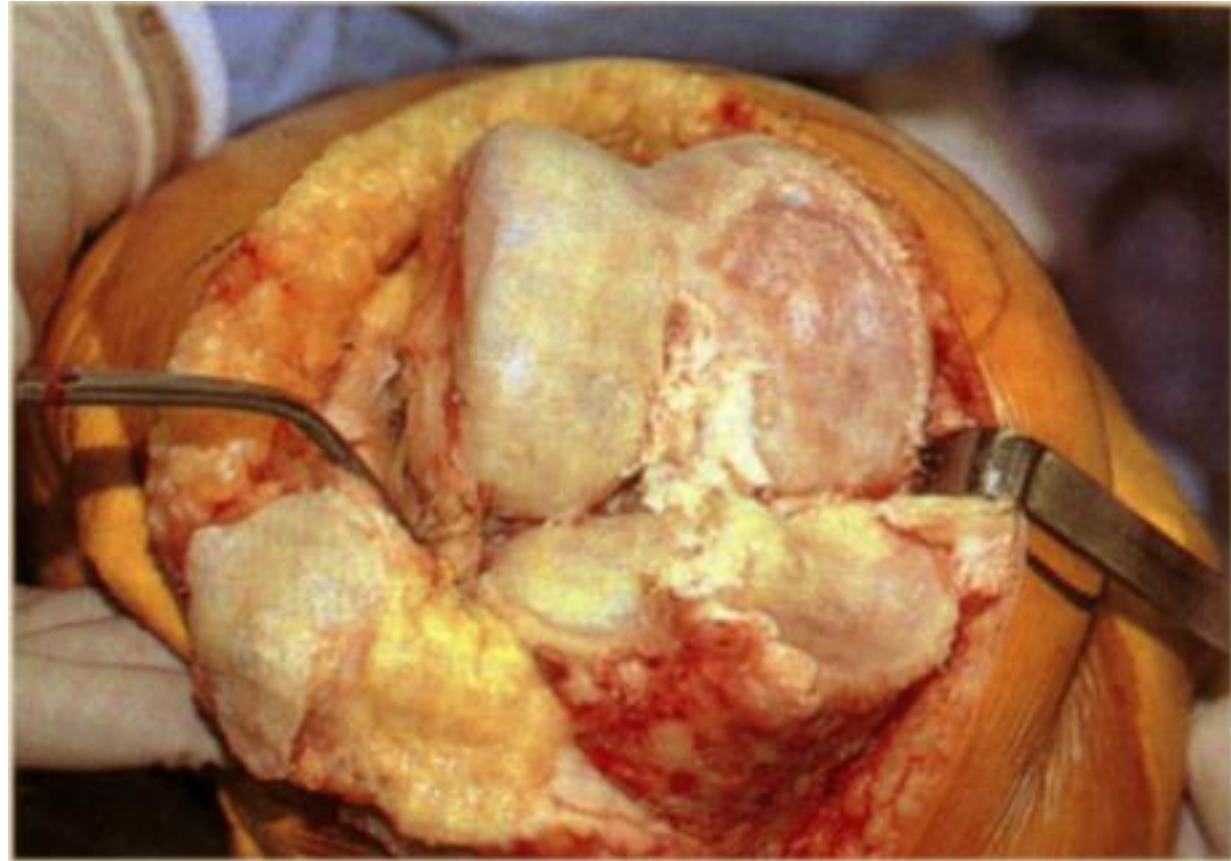
Médio vasto





subvasto

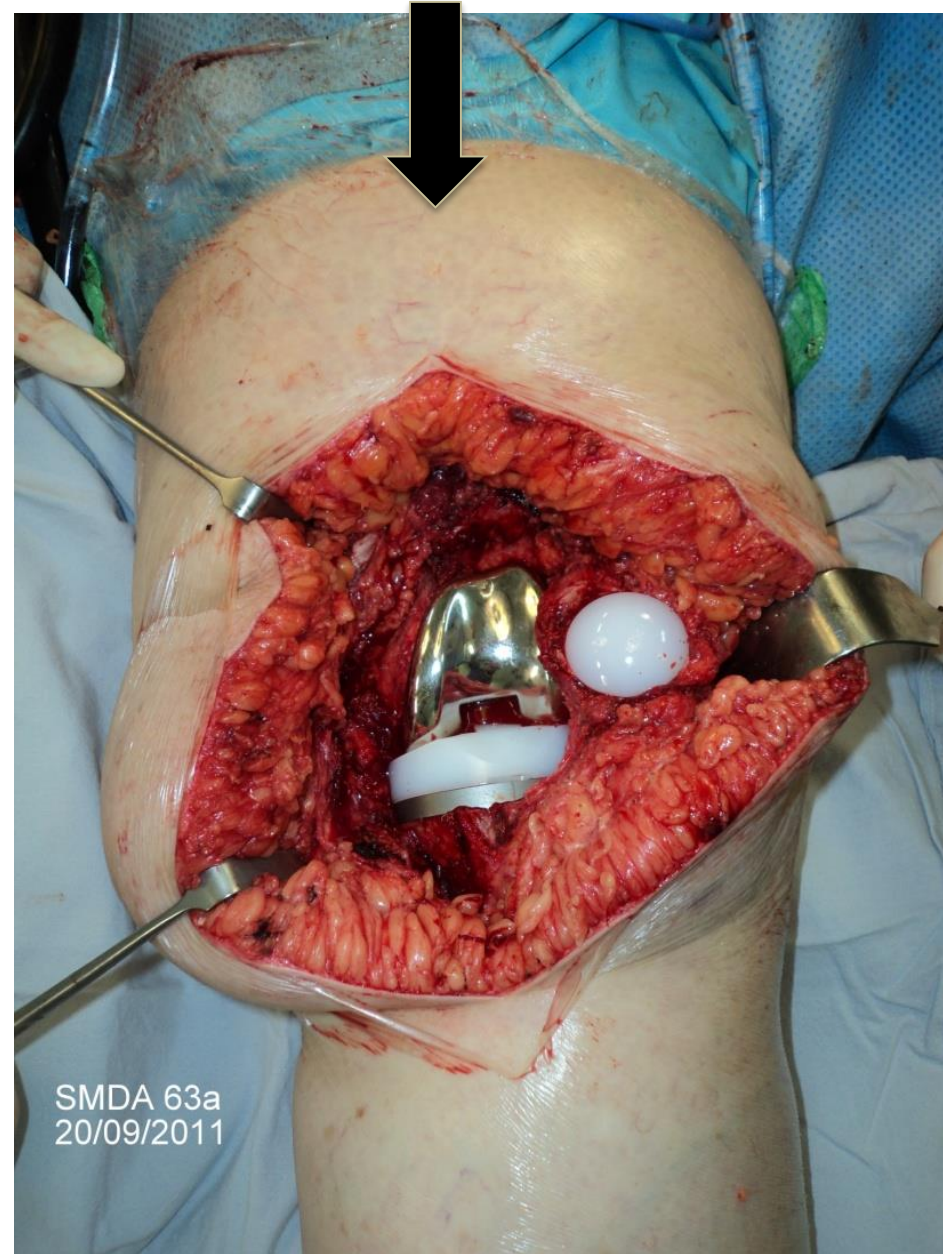
# Exposição Ampla da Articulação



SMDA 63a  
20/09/2011



SMDA 63a  
20/09/2011



SMDA 63a  
20/09/2011

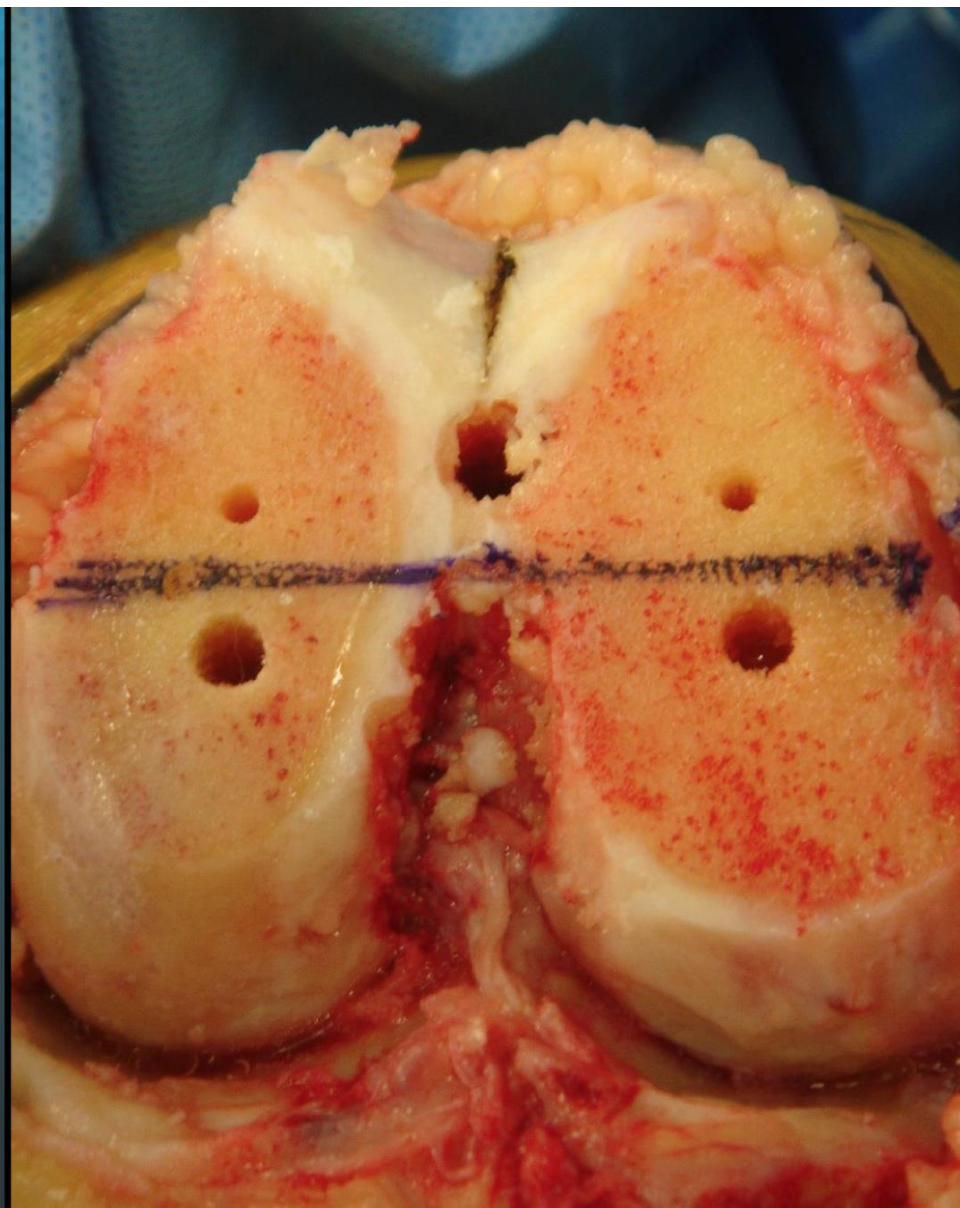
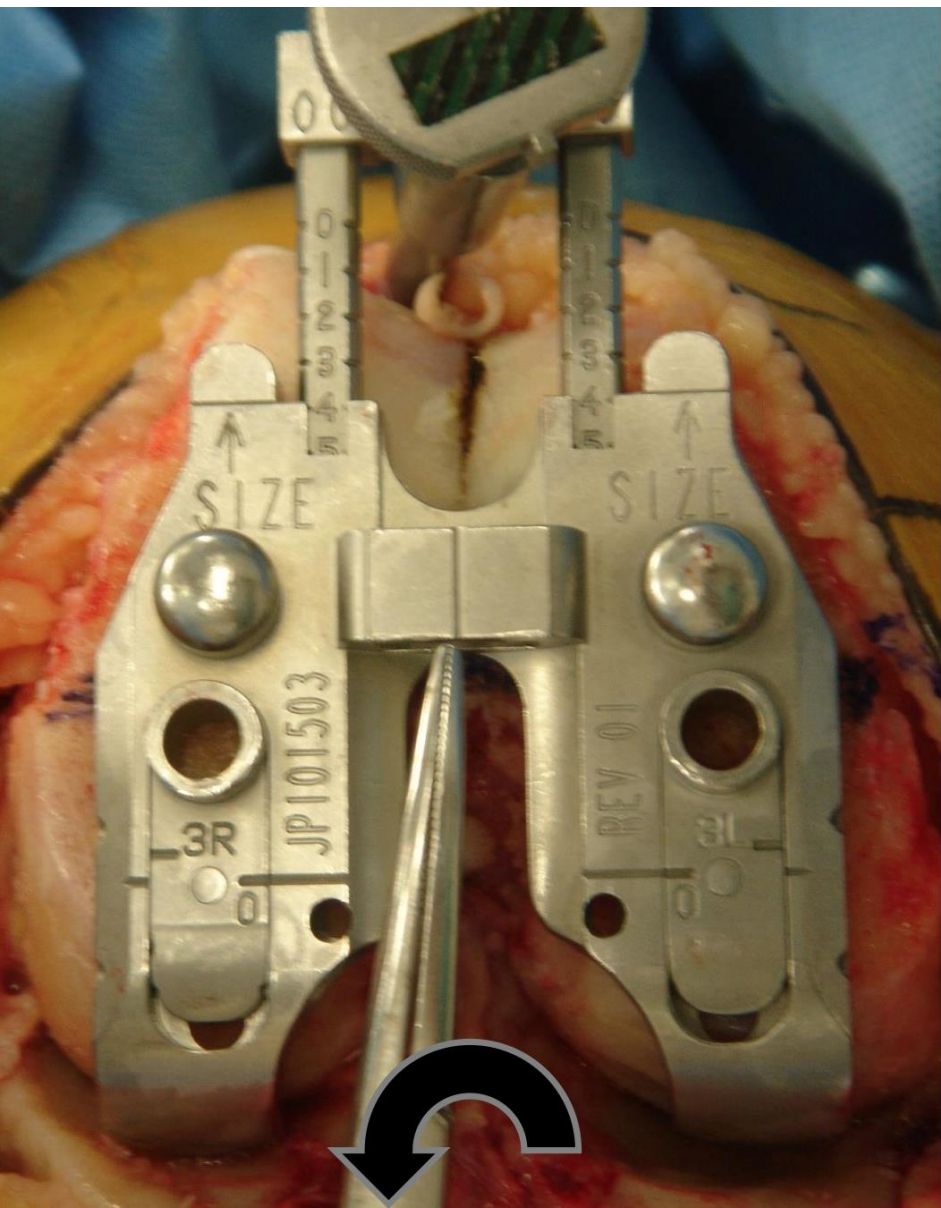
# Corte Distal do Fêmur

# Corte Proximal da Tíbia



+

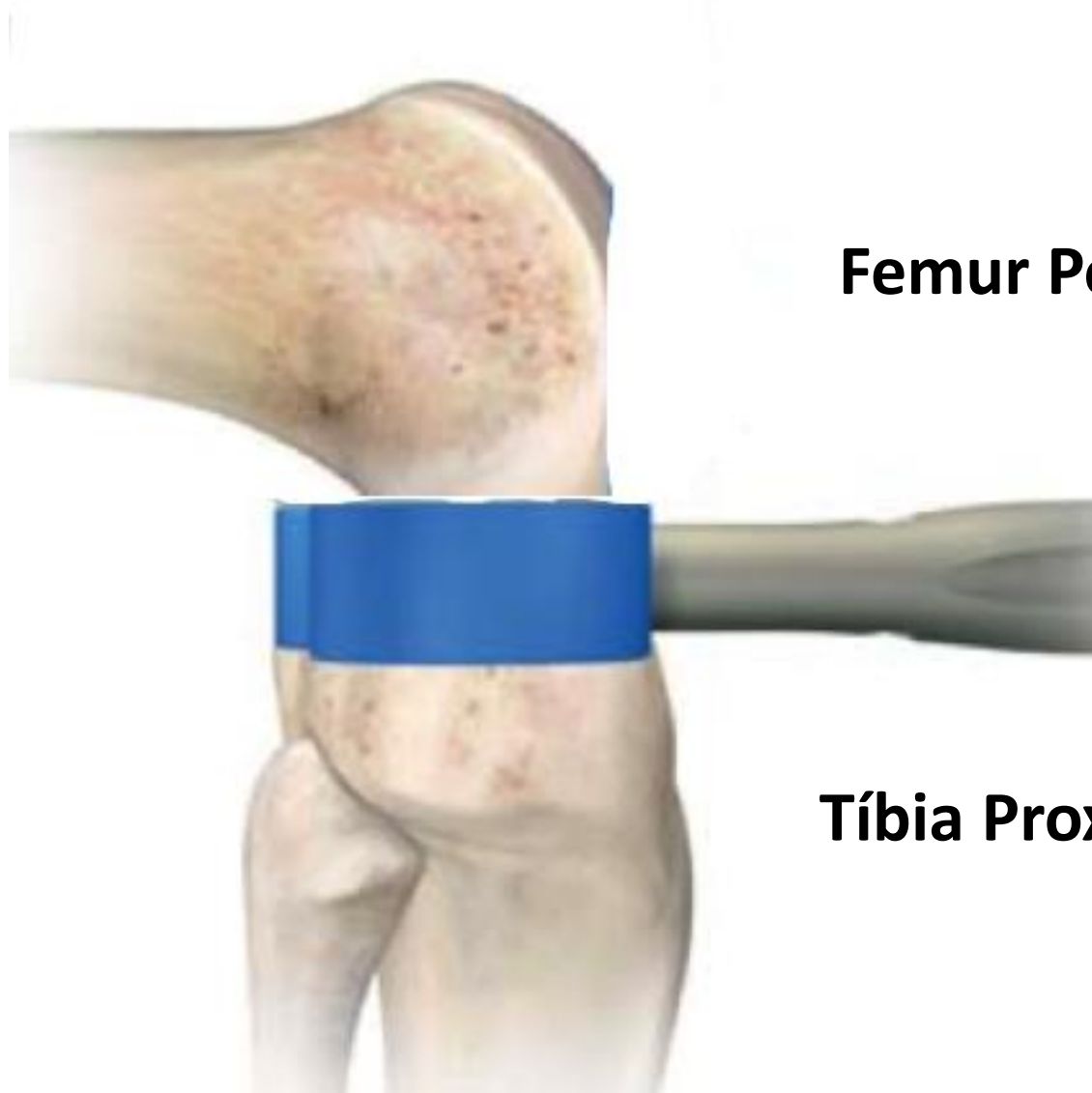




# Extensão



# Flexão



**Femur Posterior**

**Tíbia Proximal**

# Tibia Proximal: Flexão e Extensão

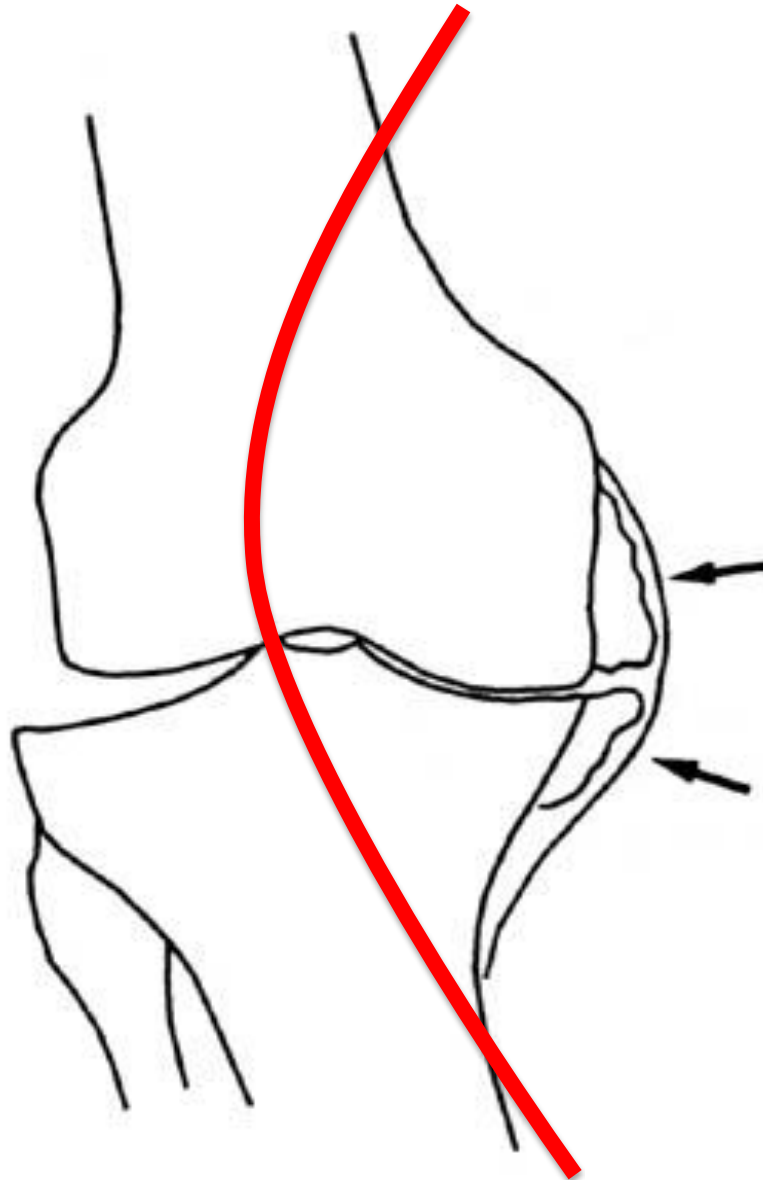




# Balanço de Partes Moles

# Deformidade em Varo

**Lado  
Convexo**



**Lado  
Côncavo**

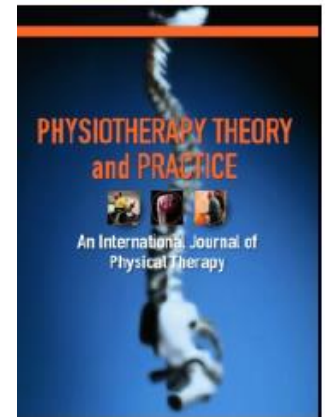
# Tratamento Fisioterapêutico

# **Tratamento Fisioterapêutico**

## **1. Pré-operatório**

## Physiotherapy Theory and Practice

# Does preoperative physiotherapy improve postoperative, patient-based outcomes in older adults who have undergone total knee arthroplasty? A systematic review



Ross Alexander Chesham MSc & Sivaramkumar Shanmugam PhD



Published online: 13 Oct 2016

### ABSTRACT

**Background:** Knee osteoarthritis (OA) is a leading cause of disability in older adults ( $\geq 60$ ) in the UK. If nonsurgical management fails and if OA severity becomes too great, knee arthroplasty is a preferred treatment choice. Preoperative physiotherapy is often offered as part of rehabilitation to improve postoperative patient-based outcomes. **Objectives:** Systematically review whether preoperative physiotherapy improves postoperative, patient-based outcomes in older adults who have undergone total knee arthroplasty (TKA) and compare study interventions to best-practice guidelines. **Method:** A literature search of Randomized Controlled Trials (RCTs), published April 2004–April 2014, was performed across six databases. Individual studies were evaluated for quality using the PEDro Scale. **Results:** Ten RCTs met the full inclusion/exclusion criteria. RCTs compared control groups versus: preoperative exercise ( $n = 5$ ); combined exercise and education ( $n = 2$ ); combined exercise and acupuncture ( $n = 1$ ); neuromuscular electrical stimulation (NMES;  $n = 1$ ); and acupuncture versus exercise ( $n = 1$ ). RCTs recorded many patient-based outcomes including knee strength, ambulation, and pain. Minimal evidence is presented that preoperative physiotherapy is more effective than no physiotherapy or usual care. PEDro Scale and critical appraisal highlighted substantial methodological quality issues within the RCTs. **Conclusion:** There is insufficient quality evidence to support the efficacy of preoperative physiotherapy in older adults who undergo total knee arthroplasty.

# Pré-operatório

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## Orientações:

- ✓ Instruir posicionamento do membro
- ✓ Instruir deambulação
- ✓ Instruir exercícios para MMII
- ✓ Instruir exercícios respiratórios

# **Tratamento Fisioterapêutico**

## **2. Período hospitalar**

# **Tratamento Fisioterapêutico**

## **2. Período hospitalar**

### **2.1 Prevenção de complicações**



# Pós-operatório

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## Objetivos:

- ✓ Prevenir Embolia Pulmonar
- ✓ Prevenir Úlcera de Pressão
- ✓ Prevenir TVP
- ✓ Melhorar ADM
- ✓ Fortalecimento muscular
- ✓ Independência funcional





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## **Primeiro estágio:**

- ✓ Pós operatório imediato (internação)**
- ✓ Inicia-se após 24 h de pós cirúrgico**
- ✓ Exercícios ativação muscular**
- ✓ Ganho de ADM gradual**
- ✓ Posicionamento no leito**
- ✓ Prevenção de doenças tromboembólicas**





## Andar com o paciente no primeiro dia de pós-operatório



# Mobilização passiva contínua



# Mobilização passiva contínua



**Cochrane**  
**Library**

Cochrane Database of Systematic Reviews

## Continuous passive motion following total knee arthroplasty in people with arthritis (Review)

Harvey LA, Brosseau L, Herbert RD

Harvey LA, Brosseau L, Herbert RD.

Continuous passive motion following total knee arthroplasty in people with arthritis.

*Cochrane Database of Systematic Reviews* 2014, Issue 2. Art. No.: CD004260.

DOI: 10.1002/14651858.CD004260.pub3.

[www.cochranelibrary.com](http://www.cochranelibrary.com)



# Mobilização passiva contínua

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- **Resultados**
  - **Moderada: ausência efeitos clínicos ADM flx**
  - **Baixa: ausência efeitos clínicos DOR**
  - **Moderada: ausência efeitos clínicos FUNÇÃO**
  - **Moderada: ausência efeitos clínicos QDV**
  - **Muito baixa: reduz risco de manipulação sob anestesia**

# **Tratamento Fisioterapêutico**

## **2. Após alta hospitalar**



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## **Segundo estágio → após alta hospitalar**

- ✓ **Ganho de ADM**
- ✓ **Fortalecimento muscular**
- ✓ **Treino de marcha sem uso de dispositivos**
- ✓ **Treino de equilíbrio**
- ✓ **Treino de função**















Research

Incorporating hip abductor strengthening exercises into a rehabilitation program did not improve outcomes in people following total knee arthroplasty: a randomised trial

Margaret B Schache <sup>a,b</sup>, Jodie A McClelland <sup>a</sup>, Kate E Webster <sup>a</sup>

<sup>a</sup>School of Allied Health, La Trobe University, Melbourne; <sup>b</sup>Physiotherapy Department, Donvale Rehabilitation Hospital, Melbourne, Australia

**Question:** In adults following primary total knee arthroplasty, does the incorporation of hip abductor strengthening exercises into a 6-week rehabilitation program improve muscle strength, functional performance and patient-reported outcomes at the end of rehabilitation and at 26 weeks? **Design:** Randomised controlled trial with concealed allocation, blinded assessors and intention-to-treat analysis. **Participants:** One hundred and five adults admitted to an inpatient rehabilitation facility immediately following total knee arthroplasty. **Intervention:** Participants in both groups attended 12 days of inpatient physiotherapy followed by 6 weeks of outpatient physiotherapy, which aimed to improve knee range of movement, strength and mobility. The experimental group completed a standard rehabilitation protocol with the addition of hip abductor strengthening. The control group completed the same standard rehabilitation protocol, with the addition of 15 minutes of general functional exercises. **Outcome measures:** Primary outcomes were the Knee Injury and Osteoarthritis Outcome Score (KOOS) and isometric hip abductor muscle strength normalised to body mass index. Secondary outcome measures included the stair climb test, 6-minute walk test, Timed Up and Go test, 40-m fast-paced walk test, 30-second chair stand test, step test, isometric quadriceps muscle strength, Lower Extremity Functional Scale, and Short Form-12. **Results:** The experimental intervention did not result in significantly greater improvements in hip strength, KOOS or any of the secondary outcome measures than the control intervention at 6 weeks or 26 weeks. **Conclusion:** Similar improvements in muscle strength, functional performance and patient-reported outcomes were observed whether specific hip-strengthening exercises were incorporated or general functional exercises were continued instead as part of a postoperative rehabilitation program for participants after total knee arthroplasty. **Registration:** ANZCTR 12615000863538. [Schache MB, McClelland JA, Webster KE (2019)

# **Recursos Tecnológicos no Tratamento Fisioterapeutico Pós ATJ**

# Internet-Based Outpatient Telerehabilitation for Patients Following Total Knee Arthroplasty

A Randomized Controlled Trial

PEdro 8/10

By Trevor G. Russell, PhD, Peter Buttrum, BPhy, Grad Cert (Health Management),  
Richard Wootton, DSc, PhD, and Gwendolen A. Jull, PhD

Teleatendimento  
síncrono

*Investigation performed at the Queen Elizabeth II Jubilee Hospital, Brisbane, Australia*

*J Bone Joint Surg Am.* 2011;93:113-20

**Background:** Total knee arthroplasty is an effective means for relieving the symptoms associated with degenerative arthritis of the knee. Rehabilitation is a necessary adjunct to surgery and is important in regaining optimum function. Access to high-quality rehabilitation services is not always possible, especially for those who live in rural or remote areas. The aim of this study was to evaluate the equivalence of an Internet-based telerehabilitation program compared with conventional outpatient physical therapy for patients who have had a total knee arthroplasty.

**Methods:** This investigation was a single-blinded, prospective, randomized, controlled noninferiority trial. Sixty-five participants were randomized to receive a six-week program of outpatient physical therapy either in the conventional manner or by means of an Internet-based telerehabilitation program. The primary outcome measure was the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) measured at baseline and six weeks by a blinded independent assessor. Secondary outcomes included the Patient-Specific Functional Scale, the timed up-and-go test, pain intensity, knee flexion and extension, quadriceps muscle strength, limb girth measurements, and an assessment of gait. Noninferiority was assessed through the comparison of group differences with a noninferiority margin and with linear mixed model statistics.

**Results:** Baseline characteristics between groups were similar, and all participants had significant improvement on all outcome measures with the intervention ( $p < 0.01$  for all). After the six-week intervention, participants in the telerehabilitation group achieved outcomes comparable to those of the conventional rehabilitation group with regard to flexion and extension range of motion, muscle strength, limb girth, pain, timed up-and-go test, quality of life, and clinical gait and WOMAC scores. Better outcomes for the Patient-Specific Functional Scale and the stiffness subscale of the WOMAC were found in the telerehabilitation group ( $p < 0.05$ ). The telerehabilitation intervention was well received by participants, who reported a high level of satisfaction with this novel technology.

**Conclusions:** The outcomes achieved via telerehabilitation at six weeks following total knee arthroplasty were comparable with those after conventional rehabilitation.

**Level of Evidence:** Therapeutic Level I. See Instructions to Authors for a complete description of levels of evidence.

# Effect of telerehabilitation on mobility in people after hip surgery: a pilot feasibility study

Alon Kalron<sup>a</sup>, Heba Tawil<sup>a</sup>, Sara Peleg-Shani<sup>c</sup> and Jean-Jacques Vatine<sup>b,c</sup>

International Journal of Rehabilitation Research 2018, Vol 00 No 00

PE Dro 6/10

- 40 participantes (67 anos)
- Grupo telereabilitação (vídeos)
- Grupo cartilha
- 6 semanas; 3x/semana
- Tratamento presencial 2x/semana (ambos os grupos)
- Resultados:
  - TUG ✓
  - TC2 ✓
  - 10mWT
  - Sentar e levantar ✓
  - Velocidade da marcha e comprimento do passo ✓

# Formal Physical Therapy After Total Hip Arthroplasty Is Not Required

PEDro 7/10

## A Randomized Controlled Trial

*J Bone Joint Surg Am.* 2017;99:648-55 • <http://dx.doi.org/10.2106/JBJS.16.00674>

Matthew S. Austin, MD, Brian T. Urbani, BS, MS, Andrew N. Fleischman, MD, Navin D. Fernando, MD, FRCSC, James J. Purtill, MD, William J. Hozack, MD, Javad Parvizi, MD, FRCS, and Richard H. Rothman, MD, PhD

- 120 pacientes (média 61,7 anos, IMC 29,3)
- GC orientação de exercícios + atendimento 2-3x/semana (8 semanas)
- GI cartilha de exercícios (10 semanas)
- Follow up: 1, 6 e 12mPO
- Sem diferença
  - Harris Hip Score (primária)
  - Womac
  - SF36

- **Avaliadores não cegados**
- **Atendimento diário durante a internação**
- **Sem precauções de quadril**

# **Avaliação do desempenho funcional**

# Avaliação da capacidade funcional após ATJ

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## Questionários auto-relato

- **Baixo custo**
- **Fácil administração**
- **Tendência a superestimar a função**

## Testes de desempenho físico

- **Avaliação objetiva da função**
- **Avaliam tarefas isoladas**

(STRATFORD et al., 2003; MALY; COSTIGAN; OLNEY, 2006)

# Métodos – Avaliação Funcional

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- **Questionário subjetivo**

- **WOMAC (Western Ontario McMaster Universities Osteoarthritis Index)**

- **Escala função: 0 – 68 pontos**
    - **Escala dor: 0 – 20 pontos**
    - **Escala rigidez: 0 – 8 pontos**

0 = ausência de comprometimento da função/dor

Traduzido e validado por FERNANDES, et al (2002)



Pergunta: Qual o grau de dificuldade que você tem ao:

1 – Descer escadas:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

**0**

**1**

**2**

**3**

**4**

2 – Subir escadas:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

3 – Levantar-se estando sentado:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

4 – Ficar em pé:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

5 – Abaixar-se para pegar algo:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

6 – Andar no plano:

Nenhuma [ ] Pouca [ ] Moderada [ ] Intensa [ ] Muito Intensa [ ]

# OARSI recommended performance-based tests to assess physical function in people diagnosed with hip or knee osteoarthritis

F. Dobson †\*, R.S. Hinman †, E.M. Roos †‡, J.H. Abbott §, P. Stratford ||, A.M. Davis ¶#††, R. Buchbinder ‡‡, L. Snyder-Mackler §§, Y. Henrotin ||||, J. Thumboo ¶¶, P. Hansen ##, K.L. Bennell †



Osteoarthritis and Cartilage 21 (2013) 1042–1052

| Recommended set of performance-based measures of physical function |                                 |
|--|---------------------------------|
| Recommended Activity   | Recommended Test                |
|  | <b>Minimum core set</b>         |
| Sit-to-stand   | 30 second chair stand test      |
| Walking short distances  | 4x10m fast-paced walk test      |
| Stair negotiation  | <i>[No test recommendation]</i> |
| Ambulatory transitions   | Timed up and go test            |
| Aerobic capacity / walking long distances                          | Six-minute walk test            |



10m  
4X



# Avaliação Funcional

---

- **Testes de desempenho físico**
  - **TC6m (teste de caminhada de seis minutos)**
    - Metodologia *American Thoracic Society* (CRAPO et al., 2002)



30 metros  
6 minutos

# Avaliação Funcional

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– *Timed up and go*



# Avaliação Funcional

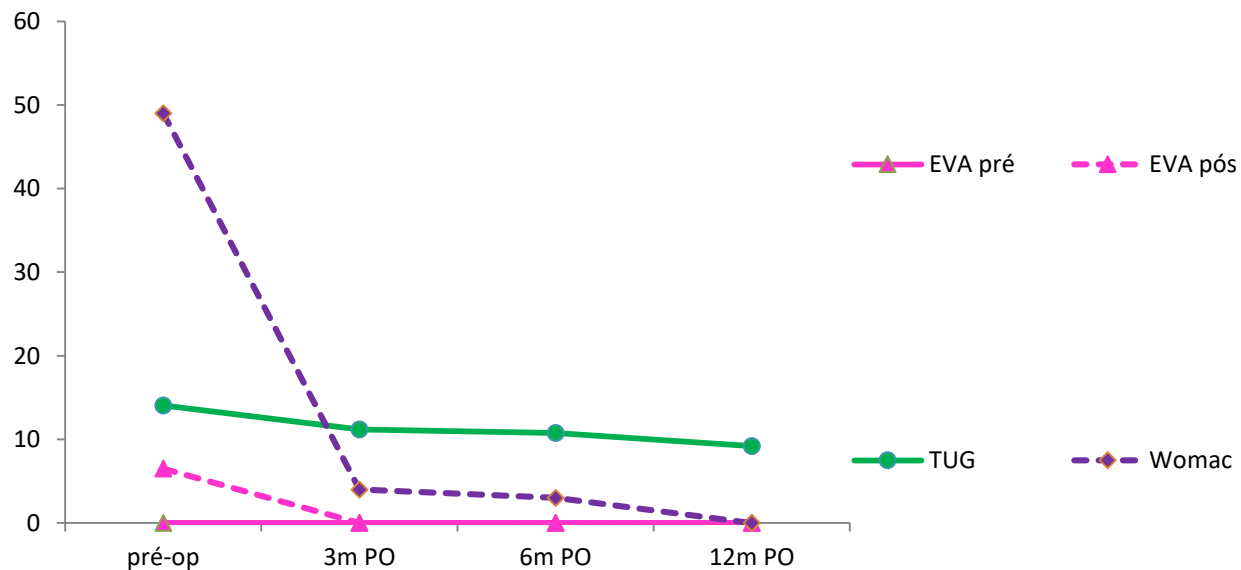
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- Força dos músculos extensores e flexores do joelho



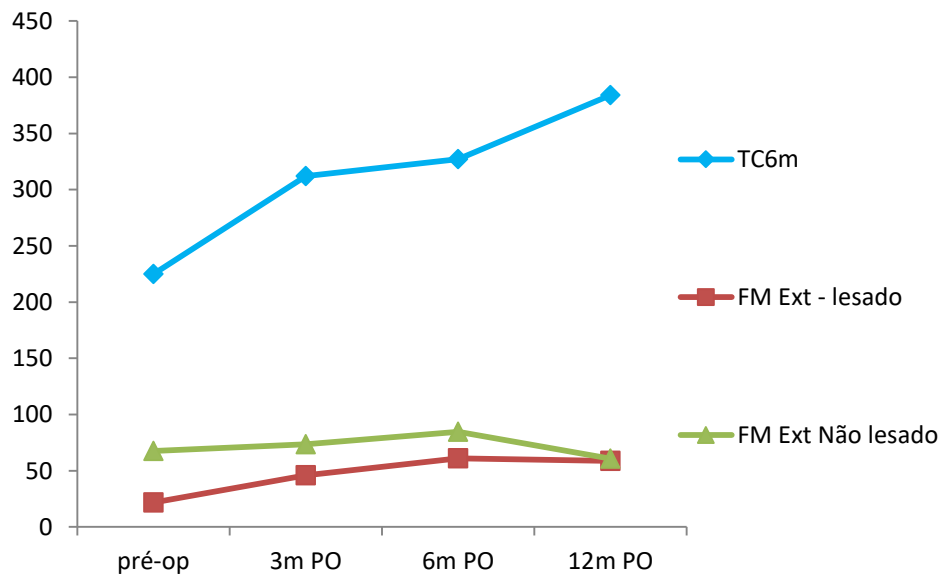
# Resultados Funcionais

|        | EVA pré | EVA pós | TUG   | Womac |
|--------|---------|---------|-------|-------|
| pré-op | 0       | 6,5     | 14,05 | 49    |
| 3m PO  | 0       | 0       | 11,17 | 4     |
| 6m PO  | 0       | 0       | 10,75 | 3     |
| 12m PO | 0       | 0       | 9,19  | 0     |



# Resultados Funcionais

|        | TC6m | FM Ext - L | FM Ext NL |
|--------|------|------------|-----------|
| pré-op | 225  | 21,8       | 67,5      |
| 3m PO  | 312  | 46         | 73,4      |
| 6m PO  | 327  | 61,1       | 84,7      |
| 12m PO | 384  | 58,7       | 60,7      |





# Complicações



# Resultados após ATJ

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- **Eficaz na redução da dor e melhora da qualidade de vida**
- **Recuperação da habilidade funcional é variável**
- **10 a 30% apresentam pouca ou nenhuma melhora**
- **Capacidade funcional é limitada em pacientes com ATJ quando comparada a idosos saudáveis**

(TAMBASCIA et al., 2015; MIZNER et al., 2011; SNYDER-MACKLER, 2010; WALSH et al., 1998; BADE; KOHRT; STEVENS-LAPSLEY, 2010; CHOI; RA, 2016)

# Capacidade Funcional após ATJ

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- **Fatores preditivos:**

- Idade e IMC
- Força muscular pré e pós-operatória
- Alinhamento componentes protésicos
- Função e dor prévia
- Fatores psicológicos

(SILVA et al., 2003; CHOONG; DOWSEY; STONEY, 2009; LONGSTAFF et al., 2009; ZENI, 2010; HUANG et al., 2012; BADE et al., 2014; PUA et al., 2015; FERREIRA et al 2021)



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# Obrigada!

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