

5th course of advanced surgery of the knee
Val d'Isère, 02-2014

Associated neurolysis in TKA

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Orthopaedic
Surgery

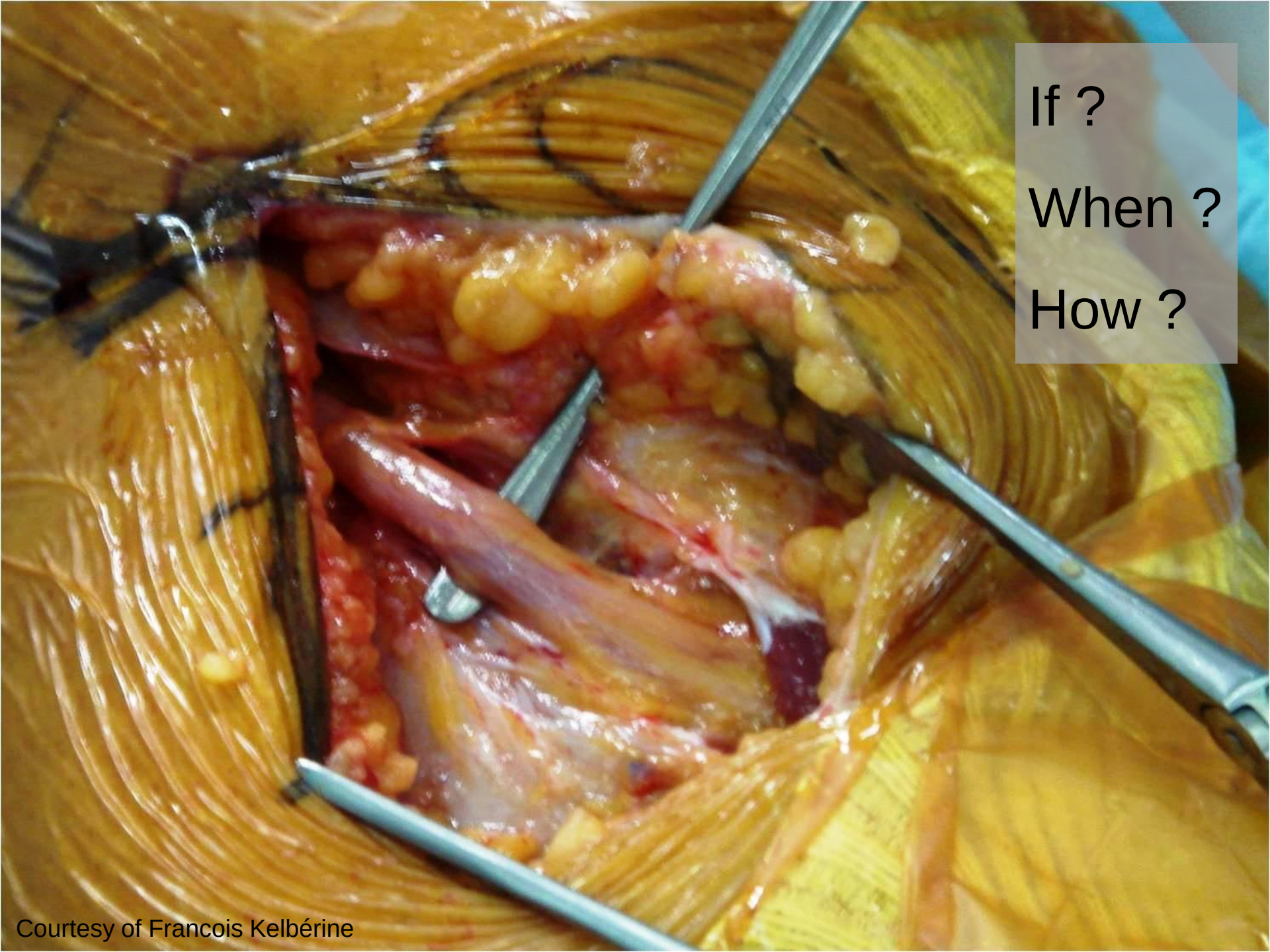


Centre Hospitalier
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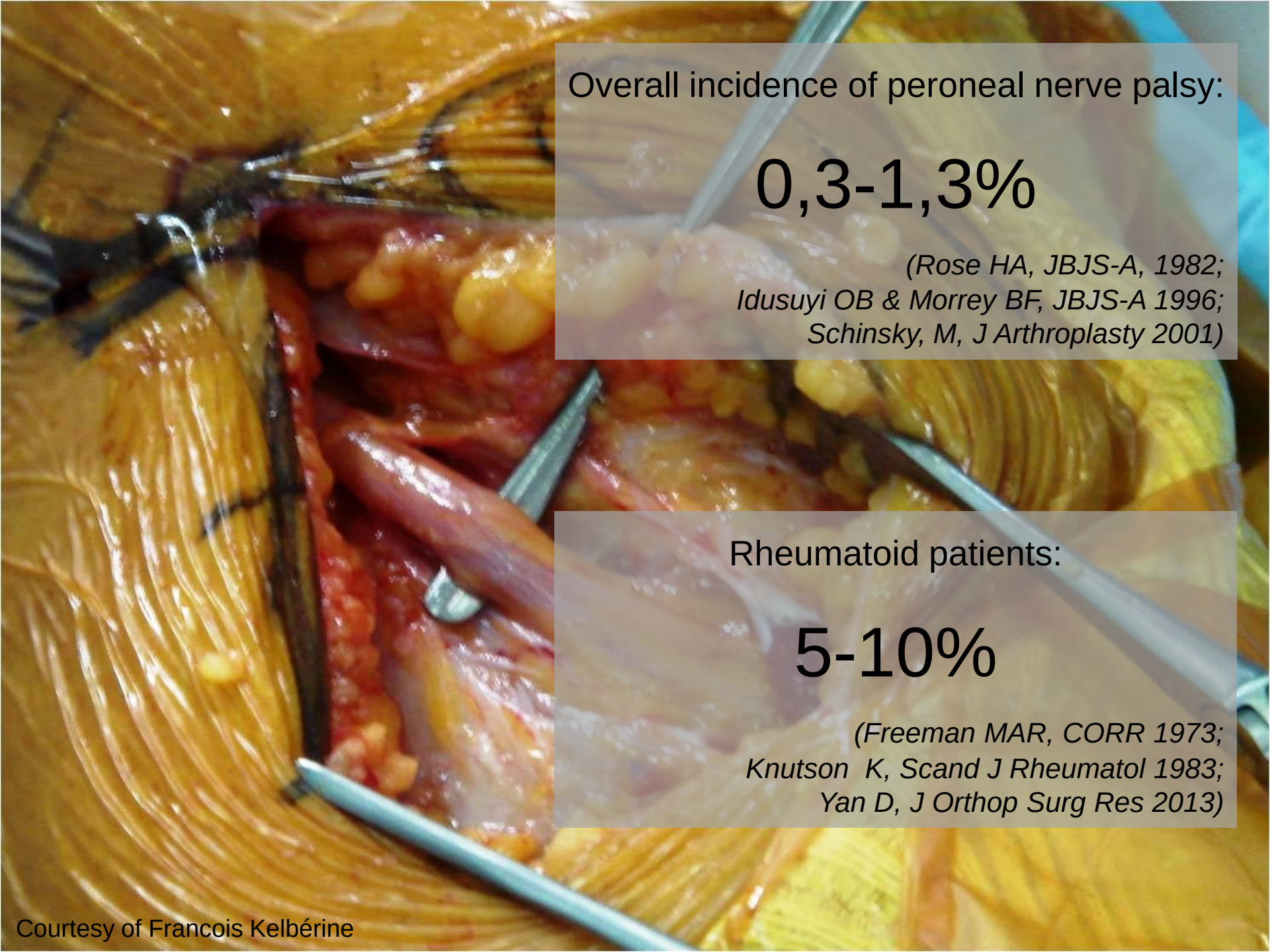
Centre de Recherche
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Luxembourg



If ?

When ?

How ?



Overall incidence of peroneal nerve palsy:

0,3-1,3%

(Rose HA, JBJS-A, 1982;
Idusuyi OB & Morrey BF, JBJS-A 1996;
Schinsky, M, J Arthroplasty 2001)

Rheumatoid patients:

5-10%

(Freeman MAR, CORR 1973;
Knutson K, Scand J Rheumatol 1983;
Yan D, J Orthop Surg Res 2013)

Incidence of peroneal nerve palsy (PNP)

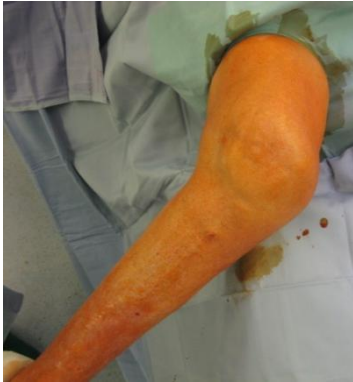
Table 1. Retrospective Studies Involving More Than 1000 TKAs

Authors	Period of study	No. of TKAs	Incidence (%)
Rose et al [1]	1974-1980	2626	0.9
Asp and Rand [2]	1972-1985	8998	0.3
Idusuyi and Morrey [3]	1979-1992	10 361	0.3
Schinsky et al [4]	1970-1998	1476	1.3



Lack of establishment of a cause-effect relationship and yet unidentified risk factors.

(Nercessian OA, J Arthroplasty 2005)



Valgus deformity and / or flexion contracture

Patients with PNP

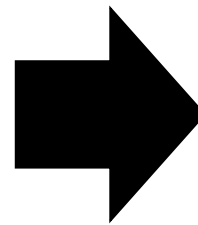
Valgus: 18° - 23°

Flexion contracture: 15,5° - 22°

*Asp JPL, Clin Orthop 1990; Bryan RS, Clin Orthop 1973;
Horlocker TT, Anesth Analg 1994; Idusuyi OB & Morrey BF, JBJS-A 1996;
Insall JN, JBJS-A 1976; Rose HA, JBJS-A 1982*

No PNP in TKA with high valgus deformity.

Miyasaka KC, Clin Orthop 1997



Postoperative patient positioning in flexion !

Risk factors: valgus knee

The main confirmed risk factor for peroneal nerve palsy !

Idusuyi OB & Morrey BF, JBJS-A 1996



type I : Lateral cartilage wear; no medial opening; minor bony deformity; complete correction with varus stress



type II : Bone deformities; medial opening; incomplete correction with varus stress



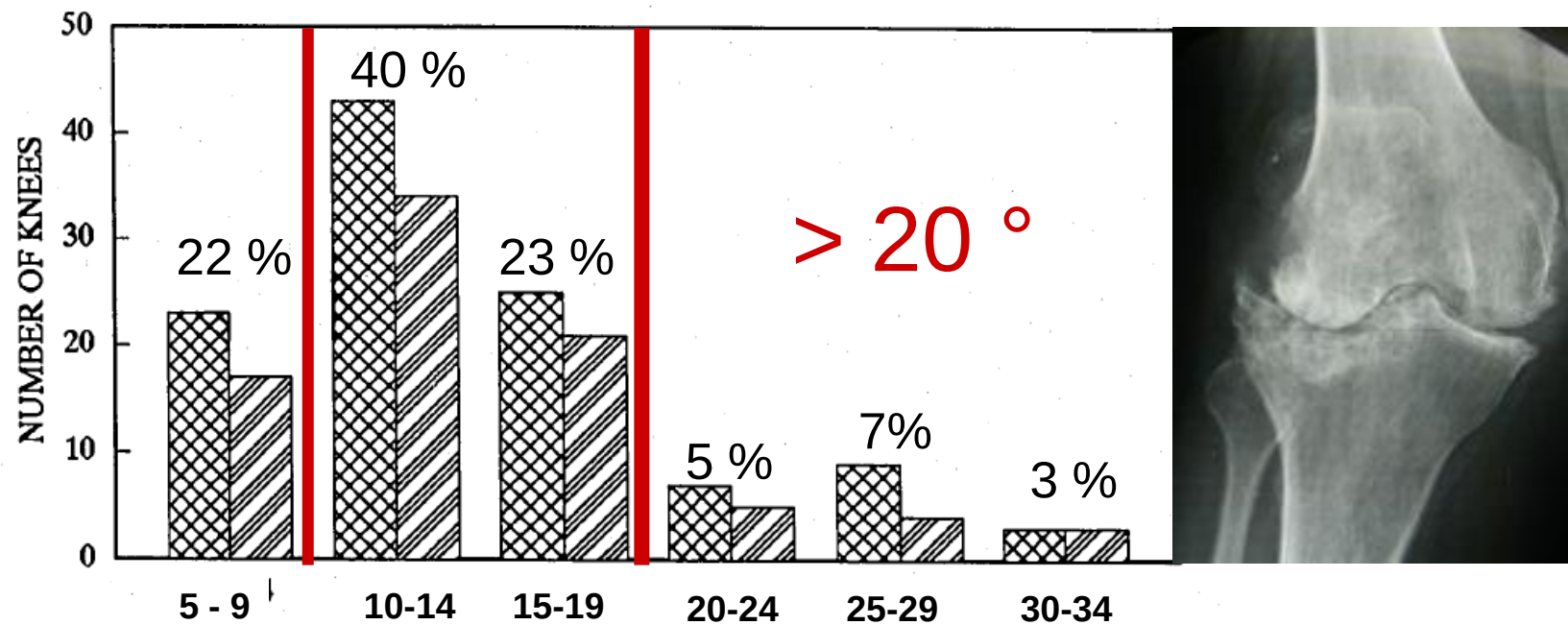
type III : Hip adduction, int.rot.femur; ext. rot. tibia



type IV : Post LCW osteotomy

Deschamps G, 2006

Risk factors: valgus knee



Distribution: mechanical axis

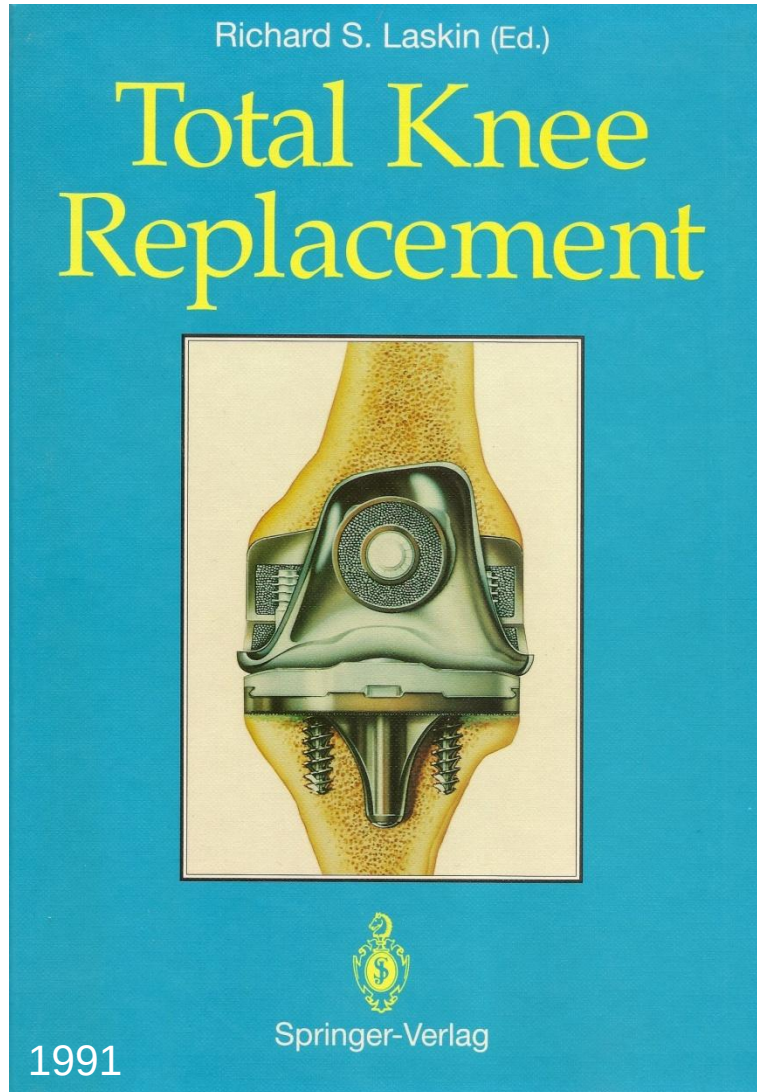
Stern SH, CORR, 1991

The valgus knee

- Degree of deformity: correctable ?



Risk factors: valgus knee

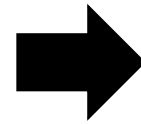
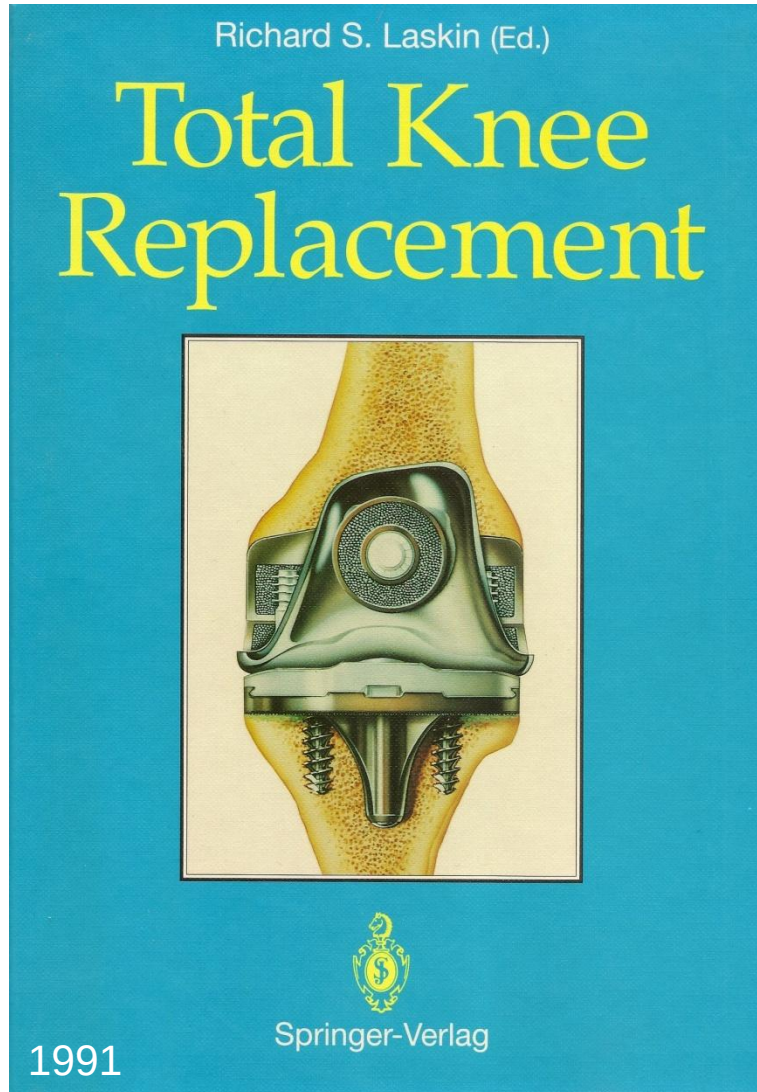


Peroneal nerve:

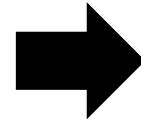
- at risk when treating any fixed valgus deformity
- if soft tissues undercorrected & attempt of forced correction
- if knee is inadvertently overcorrected by lateral soft tissue release
- local postoperative edema may cause some compression to the nerve

(Rose HA, JBJS-A, 1982)

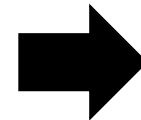
Risk factors: valgus knee



We routinely expose the nerve and free it from its sheath behind the fibular neck



if any lateral release greater than an

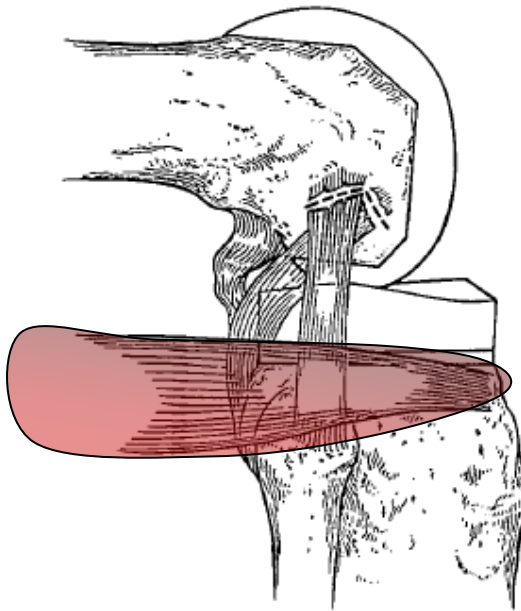


iliotibial band tenotomy is required.

Risk factors: valgus knee

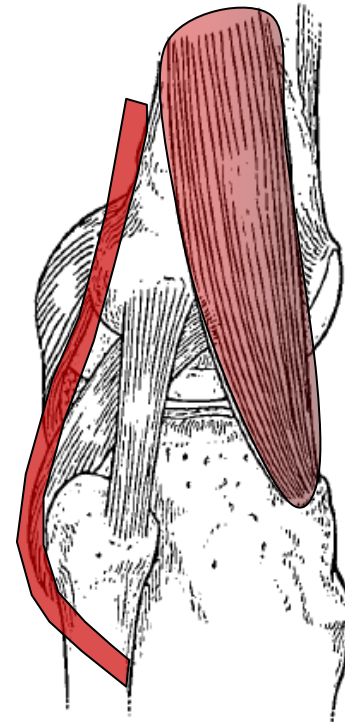
Iliotibial band

≈ peroneal nerve



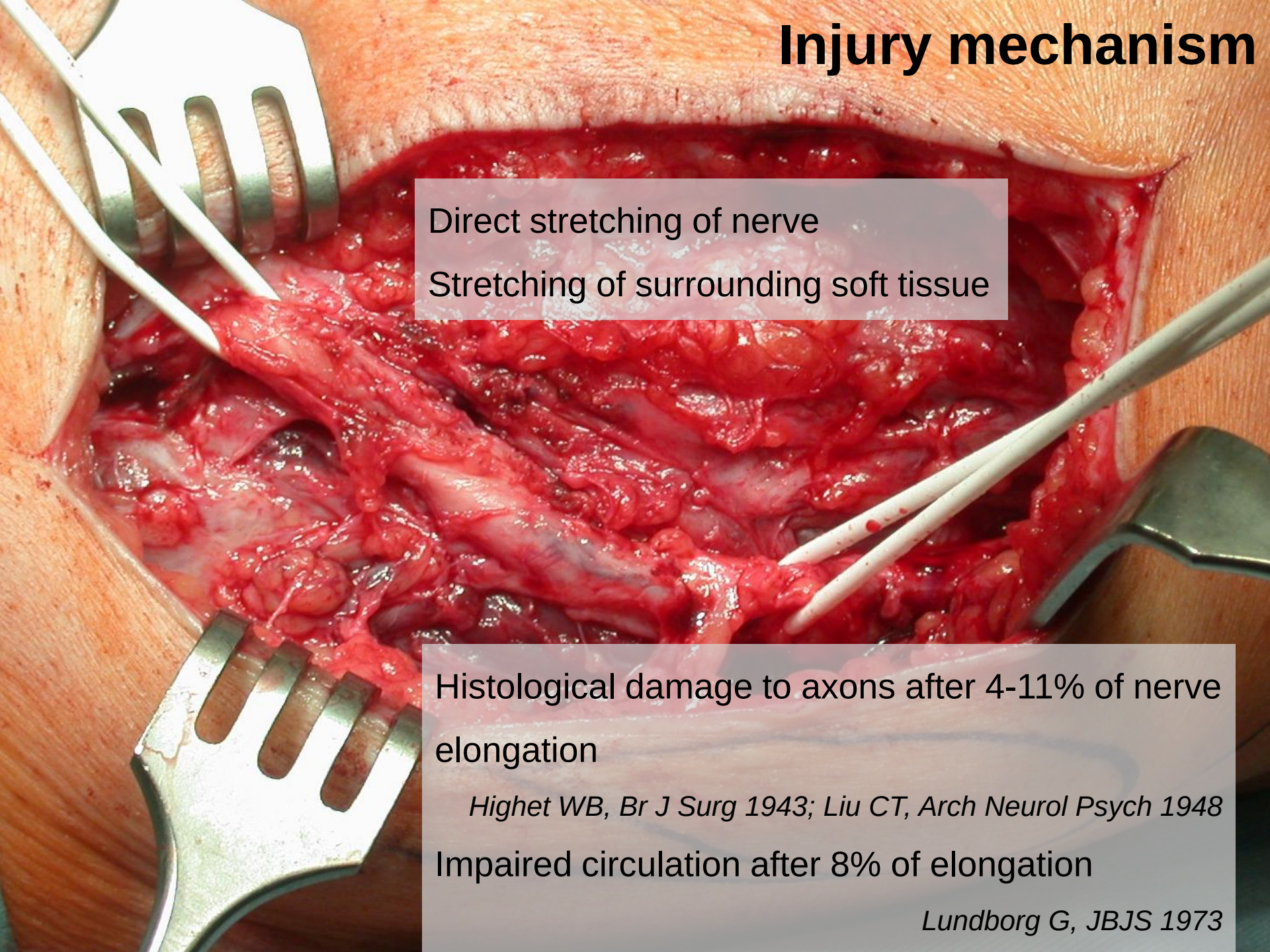
From: Whiteside L, CORR 1999

Loose in flexion



Tight in extension

Injury mechanism

An intraoperative photograph showing a surgical dissection of a nerve. The nerve is a pale, cord-like structure surrounded by red, vascularized soft tissue. Two metal surgical retractors are visible on the left side of the frame, holding back muscle and skin. Two pairs of surgical forceps are used to manipulate the nerve: one pair is at the top left, and another pair is at the bottom right, pulling the nerve taut to demonstrate its elasticity and the stretching of the surrounding tissue.

Direct stretching of nerve

Stretching of surrounding soft tissue

Histological damage to axons after 4-11% of nerve elongation

Highet WB, Br J Surg 1943; Liu CT, Arch Neurol Psych 1948

Impaired circulation after 8% of elongation

Lundborg G, JBJS 1973

Risk factors: postoperative epidural analgesia

Epidural anesthesia

- Association between EA and PNP after TKA
- Decreased proprioception and sensation postoperatively
- Late diagnosis (only 1/32 at the day 1)
- positioning of the limb in this unprotected state = contributing factor

Idusuyi OB & Morrey BF, JBJS-A 1996

Risk factors: previous neuropathy

Neuropathies (central or peripheral)

→ Association between NP and PNP after TKA

Idusuyi OB & Morrey BF, JBJS-A 1996

Horlocker TT, Anesth Analg 1994

Double-crush phenomenon

→ Existing proximal lesion makes the nerve more vulnerable to distal injury

Upton ARM, Mc Comas AJ, Lancet 1973

Risk factors: rheumatoid arthritis

PNP & TKA in rheumatoid patients: 5-10%

*Freeman MAR, CORR 1973;
Knutson K, Scand J Rheumatol 1983;
Schinsky MF, J Arthroplasty 2001;
Yan D, J Orthop Surg Res 2013*

PNP & tourniquet (time & pressure):

→ Not associated in most studies

Rose HA, JBJS-A, 1982; Asp JPL, Clin Orthop 1990;

Idusuyi OB & Morrey BF, JBJS-A 1996;

Knutson K, Scand J Rheumatol 1983

→ Association of valgus deformity 10° or higher,
preexisting neuropathy, postoperative bleeding &
total tourniquet time > 120 min. = risk factor for PNP

Horlocker TT, Anesth Analg 1994

Constrictive dressing

Coventry MB, Clin Orthop 1973; Webster DA, Clin Orthop 1985

Hematoma

Asp JPL, Clin Orthop 1990; Idusuyi OB & Morrey BF, JBJS-A 1996;

Knutson K, Scand J Rheumatol 1983

Previous osteotomy

Idusuyi OB & Morrey BF, JBJS-A 1996

Relative young age (62 with PNP vs 67 without)

Park JH, J Arthroplasty 2013

High BMI

Park JH, J Arthroplasty 2013

Role of electromyography ?

Preoperative:

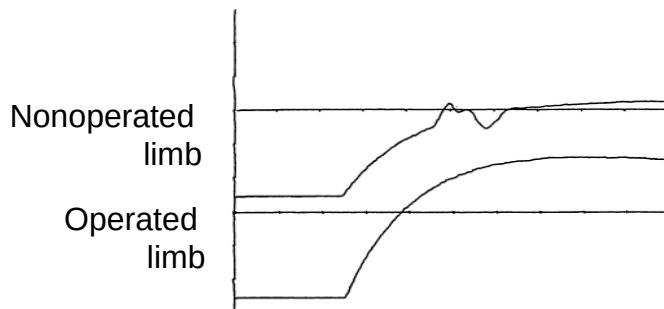
→ EMG ineffective to predict occurrence of PN palsy.

Knutson K, Scand J Rheumatol 1983

Intraoperative:

→ Intraoperative monitoring during TKA feasible.

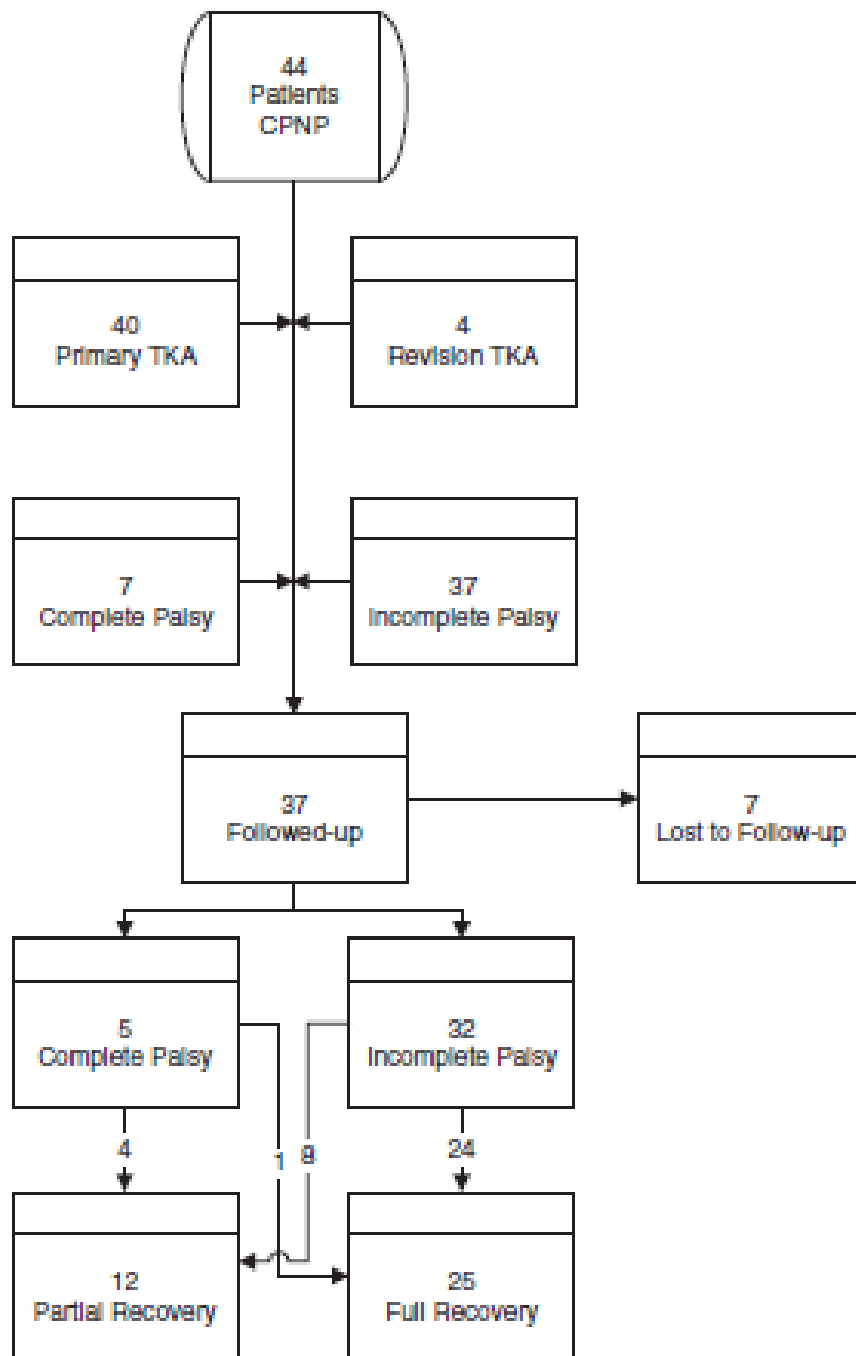
Unwin AJ, Thomas M, J Royal Soc Med 1994



Loss of EMG signal 25'
after tourniquet application

Table 2. Percentage of Patients Making Complete Recovery

Authors	Percentage of complete recovery (%)	Length of follow-up
Rose et al [1]	9.1	6 mo-7 y
Webster and Murray [9]	60	6 mo
Asp and Rand [2]	50	5.1 y
Idusuyi and Morrey [3]	50	3.9 y
Schinsky et al [4]	68	18 mo



Recovery:

→ 67% full

→ 33 % partial

→ 75 % of incomplete lesions

→ 20 % of complete lesions

Park JH, J Arthroplasty 2013

Surgery (few data):

→ Exploration & decompression

→ 5/5 recoveries (4 full, 1 partial)

→ Release if no recovery after 3 mo.

Krackow KA, Clin Orthop 1993

Conclusion

No epidural analgesia

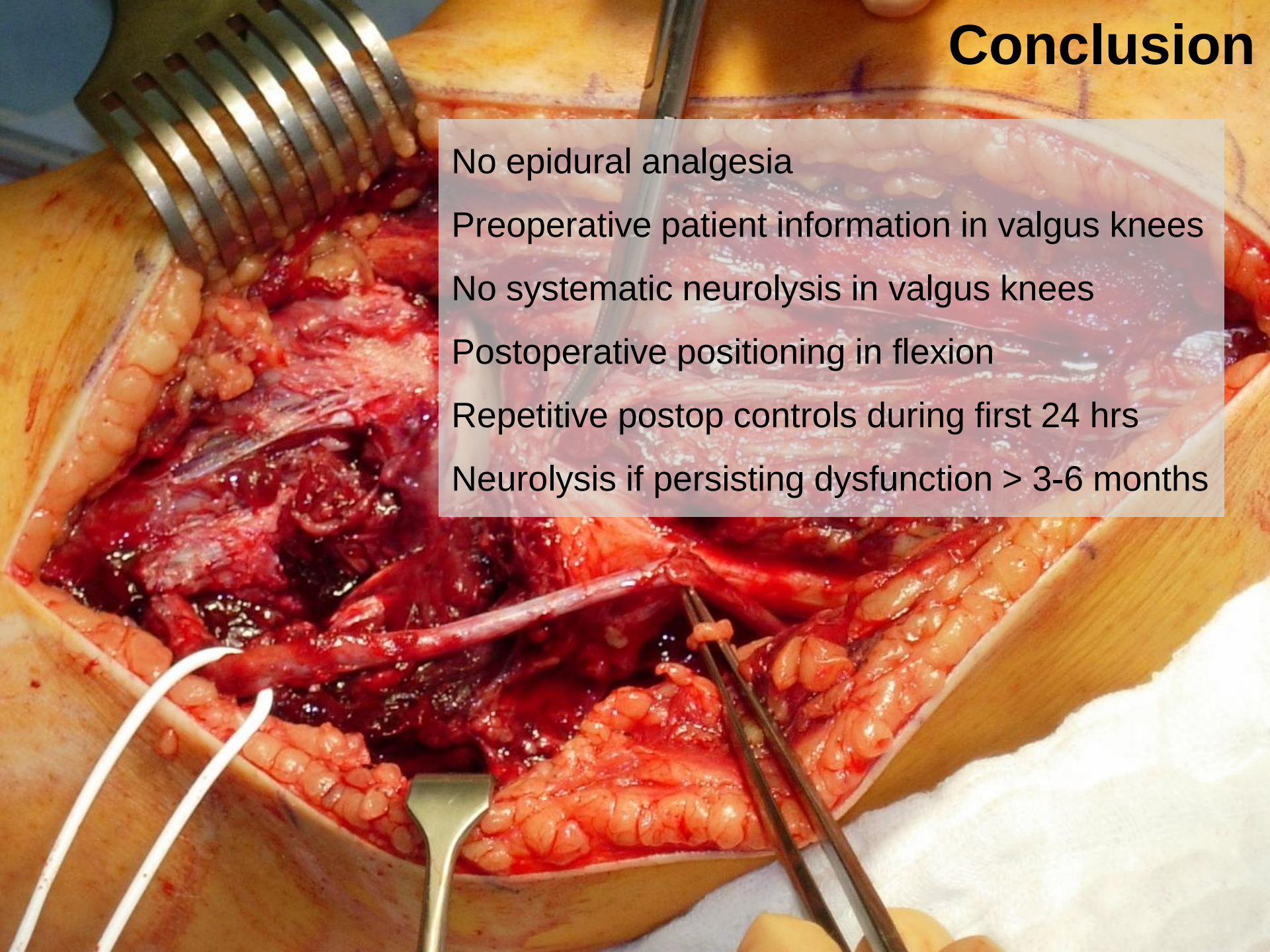
Preoperative patient information in valgus knees

No systematic neurolysis in valgus knees

Postoperative positioning in flexion

Repetitive postop controls during first 24 hrs

Neurolysis if persisting dysfunction > 3-6 months



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