



**How to identify the optimal surgical intervention for
your osteoarthritic patient**

Role of the patient

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HTO

■ Advantages

- Preservation of bone stock
- Allows high activity level
- Natural feeling knee
- Possibility to add cartilage & meniscal procedures

■ Disadvantages

- Longer rehab
- Inferior pain control



■ Advantages

- Preservation of bone stock
- Easier rehab/cosmesis
- Higher rate of forgotten knee
- Good function
- Low morbidity

■ Disadvantages

- Disease progression
- Learning curve / more things can go wrong



TKA

■ Advantages

- Reproducible technique
- Predictable results
- Inflammatory arthritis, P-F arthritis, Ligament laxity, lateral compartment disease is not an issue

■ Disadvantages

- Low rate of forgotten joint
- Pain control and ROM not as good as the patient's expectations
- Loss of bone stock makes revision harder



Patient factors in selection of treatment

- Age
- Activity level
- BMI
- Psychosocial factors
- Disease etiology
- Knee ROM
- Social habits

AGE

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HTO in younger patients

- 20-30% better results with modern techniques compared to the 90'ies.
- 80-94% good results at 10 years
- 65-90% good results at 15-20 years
 - *Saito T: Bone Joint J. 2014;96-B(3):339-44.*
 - *Harris JD: Knee. 2013;20(3):154-61.*
 - *Spahn D: Knee Surg Sports Traumatol Arthrosc. 2013 ;21(1):96*
 - *Hui C. Am J Sports Med. 2011;39(1):64-70*
 - *Gstöttner M, Arch Orthop Trauma Surg 2008; 128(1):111-115.*
 - *Sprenger TR, J Bone Joint Surg Am 2003; 85-A:469-474.*
 - *Akizuki S. J Bone Joint Surg Br 2008; 90(5):592-596.*

Uni in younger patients

- 95% good results in single series over 10 years
 - *Faour-Martin O. Acta Orthop Belg. 2015 Jun;81(2):283-8*
 - *Biswas D. J Arthroplasty. 2014 Jan;29(1):101-5.*
 - *Dalury D. J Knee Surg. 2013 Apr;26(2):133-7.*
- Post-op pain scores higher in younger patients
- 10 year survival inferior to TKA in registries: 85-86%
 - *Liddle AD. Osteoarthritis Cartilage. 2014; 22(9):1241-50.*
- Results of uni in 70(+) years superior to younger patients
 - *Sebilo A. Orthop Traumatol Surg Res. 2013;99(4 Suppl):S227-34.*

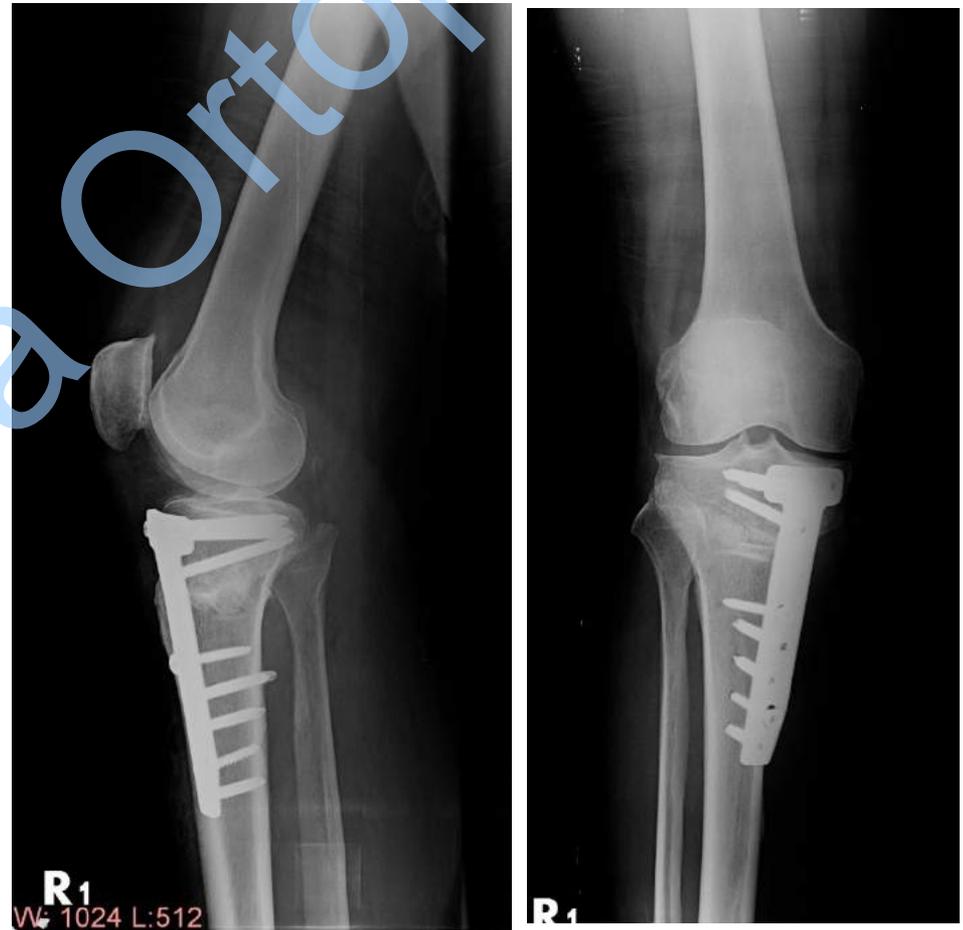
TKA in younger patients

- Finnish Registry 32,019 patients 5 year survival
 - 55 years (-) : %92
 - 55-65 years : %95
 - 65 years(+) : %97
 - *Julin J. Acta Orthop. 2010;81:413–419.*
- Swedish Registry :65,661 patients
 - Cumulative rate of revision increased by 9% in patients under 55
 - *W-Dahl A. Acta Orthop. 2010 Apr;81(2):161-4.*

Age

- Considering survival & risk of revision

1. HTO
2. TKA
3. Uni



OBESITY

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Obesity

- 32% of men & 36% of women are obese in U.S.A.
 - *Odum SM. J Arthroplasty. 2013 Sep;28(8 Suppl):148-51.*
- WHO criteria
 - Obese: BMI 30 kg/m² (+)
 - Super obese: BMI 45-50kg/m² (+)
- Risk of tricompartmental OA is higher and becomes symptomatic at an earlier age in obese patients.
 - *Guenther J. World J Orthop. 2015,18;6(1):137-44.*

Obesity & HTO

- Obesity adversely affects the results of HTO
 - *Floerkemeier S. Int Orthop. 2014 Jan;38(1):55-60.*
 - *Matthews LS. Clin Orthop Relat Res. 1988 Apr;(229):193-200.*



Obesity & Uni

- Increased risk of early revision (x2)
 - *Kandil A. J Arthroplasty. 2014 Oct 25. pii: S0883-5403(14)00791-8.*
- Relative risk of revision at 10 years 0.387, (but not statistically significant)
 - *Cavaignac E. Bone Joint J. 2013 Aug;95-B(8):1064-8.*

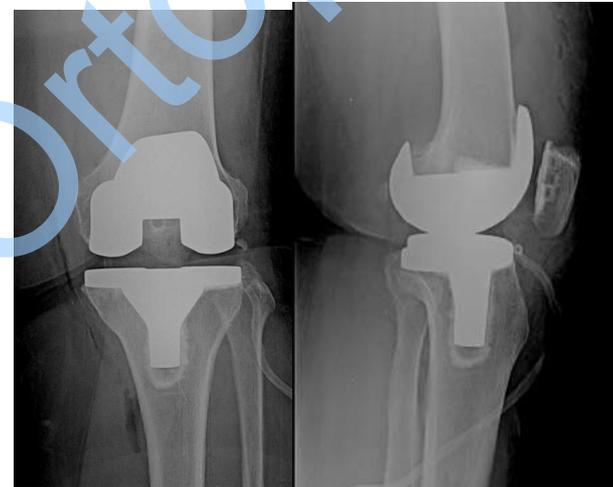
Obesity & TKA

- Increased risk of post-op complications and infection
 - *Namba RS. J Arthroplasty. 2005 Oct;20(7 Suppl 3):46-50.*
 - *Schwarzkopf R. J Arthroplasty. 2012 Mar;27(3):397-401.*
 - *Werner BC. J Arthroplasty. 2014 Dec 19. pii: S0883-5403(14)00947-4*
 - *Issa K. J Knee Surg. 2013 Apr;26(2):89-94.*
- No effect on complications and post-op morbidity
 - *Suleiman LI. J Surg Res. 2012 May 1;174(1):7-11.*
 - *Napier RJ. Knee. 2014 Jun;21(3):784-8.*

Obesity

- Considering the risk of degeneration in the contralateral compartment and disease progression

- **1. TKA**
- **2. Uni**
- **3. HTO**



- Patients do not lose weight after TKA, some even gain weight

- *Kandil A. Phys Sportsmed. 2013 May;41(2):34-7.*

ACTIVITY LEVEL

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Activity & sports after HTO

- 76% return to sports at the same level after HTO + mosaicplasty in **younger patients**
 - *Minzlaff P. KSSTA 2014 Dec 7. (Epub)*
- Low impact/short duration sports activity possible in 85-90% of **older patients** after HTO
- Skiing, cycling, jogging, tennis is reasonable
- Return to competitive sports unrealistic
 - *Salzmann GM. Am J Sports Med. 2009 ;37(2):312-8.*
 - *Saragaglia D. Int Orthop. 2014 Oct;38(10):2109-14.*

Activity & sports after uni

- Non-impact sports possible (cycling, swimming)
- Level of sports inferior and shorter compared to pre-op but the patients are still satisfied
 - *Naal FD. Am J Sports Med. 2007;35(10):1688-95.*
- Male gender, low BMI, age 65y (-) positive predictors for sports
 - *Jahnke A Int Orthop. 2014 Sep 26. [Epub ahead of print]*
 - *Pietschmann MF. Int Orthop. 2013;37(1):31-7.*
- Higher rate and shorter time to return to sports activity compared to TKA
- Less pain after sports/activity compared to TKA
 - *Hopper GP. Knee Surg Sports Traumatol Arthrosc. 2008 ;16(10):973-9.*

Activity & sports after TKA

- Low impact sports advisable
 - *Kuster MS. Sports Med. 2002;32(7):433-45.*
- Activity level does not increase significantly in most series
- Positive predictors for sports
 - Younger age, male, pre-op high activity, normal BMI
 - No effect of prosthetic design
 - *Williams DH. Clin Orthop Relat Res. 2012;470(2):555-61.*
 - *Jassim SS. Bone Joint J. 2014 ;96-B(7):923-7.*
- 25% of the patients perform high impact sports contrary to recommendations
 - *Mayr HO. J Arthroplasty. 2015 Jan;30(1):46-9.*

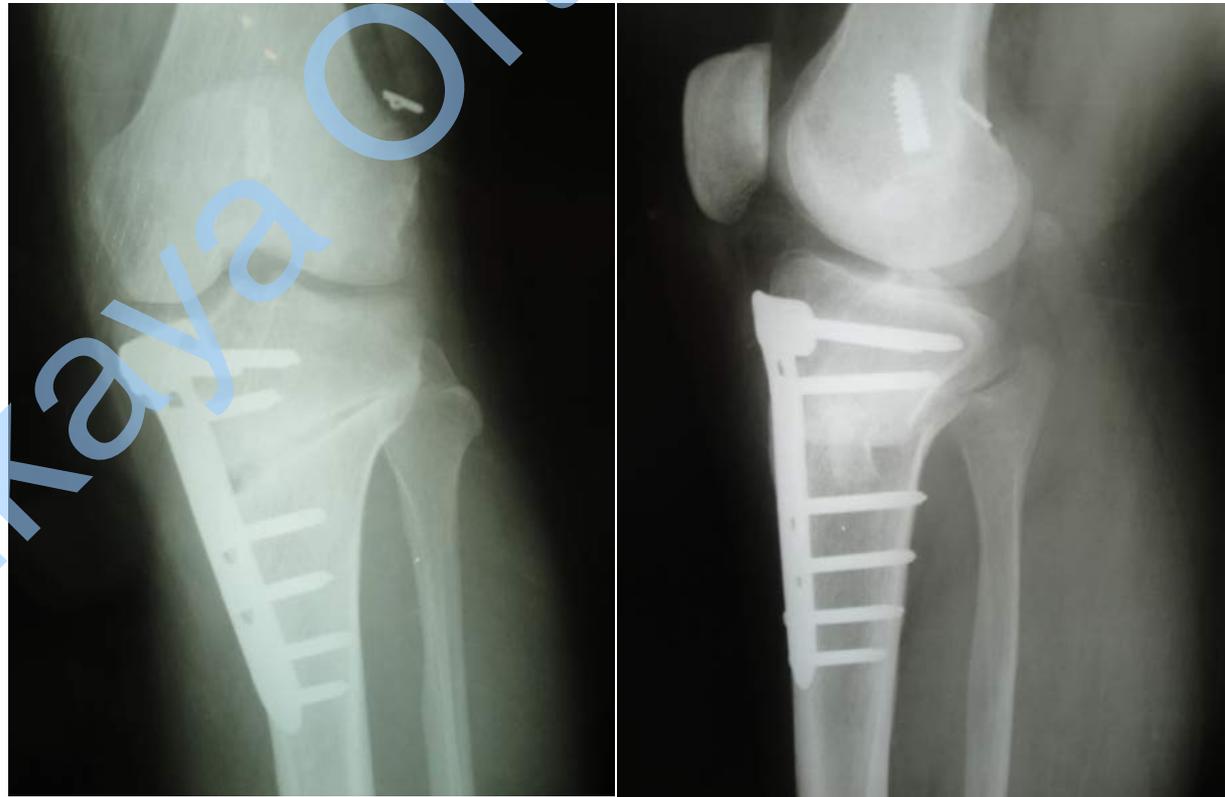
Activity level & sports

- Higher level of activity and sports, no risk of poly wear or mechanical problems..

1. **HTO**

2. **Uni**

3. **TKA**



Knee ROM

- HTO better than uni

- *Fu D: J Arthroplasty. 2013;28(5):759-65*

- Uni better than TKA

- *Griffin T. ANZ J Surg. 2007 Apr;77(4):214-21.*

- **But ...**

- Improvement in ROM possible only after TKA in stiff knees

Pain control

■ Uni better than HTO

- *Fu D: J Arthroplasty. 2013;28(5):759-65*
- *Spahn G: KSSTA 2013 Jan;21(1):96-112*

■ Uni similar or better than TKA

- *Lyons MC. Clin Orthop Relat Res. 2012;470(1):84-90.*
- *Liddle AD. Lancet. 2014;384(9952):1437-45.*



Central sensitization & chronic pain

- An important subset of knee OA patients have central sensitization and chronic pain discordant with the severity of arthritis
 - *Finan PH. Arthritis Rheum. 2013;65(2):363-72.*
 - *Fingleton C. Osteoarthritis Cartilage. 2015;23(7):1043-56.*
- Sleep disturbances, pain catastrophizing and central sensitization contribute to chronic pain before and after surgery
 - *Campbell CM. Arthritis Care Res. 2015 ;67(10):1387-96.*
 - *Skou ST, Eur J Pain. 2014;18(7):1024-31.*

Risk factors for chronic pain following arthroplasty

- Pre-op severe rest pain
 - *Bourne RB. Clin Orthop. 2010; 468(1):57-63.*
- Younger age, female, pre op anxiety/depression
 - *Parvizi J. Clin Orthop Relat Res. 2014 Jan;472(1):133-7.*
 - *O'Connor MI. Clin Orthop Relat Res. 2011 Jul;469(7):1846-51.*
 - *Bonnin MP. Knee Surg Sports Traumatol Arthrosc. 2011;19(9):1411-7.*
- Inadequate pain control after surgery
 - Consider gabapentinoids in the multi-modal pain regimen
 - *Liu SS. Reg Anesth Pain Med. 2012;37(4):415-22.*

Physcological distress ..

- Inferior outcomes in pain and function after arthroplasty surgery in patients with anxiety/depression
 - *Hirschmann MT. KSSTA 2013;21(10):2405-11.*
 - *Lavernia CJ. Clin Orthop 2015;473(1):159-63.*
- These patients still improve after TKA, pain relief may take longer than 1 year
 - *Blackburn J. Knee. 2012;19(5):522-4.*
 - *Brander V. Clin Orthop Relat Res. 2007;464:21-6.*
 - *Pérez-Prieto D. J Arthroplasty. 2014 Jan;29(1):44-7.*

Social Habits ..



- Smoking increases surgical site infections, delayed wound healing & early morbidity and readmission rates
 - *Maradit Kremers H. J Arthroplasty. 2015;30(10):1852-4.*
 - *Duchman KR, J Bone Joint Surg Am. 2015 Jul 1;97(13):1049-58.*
- Alcohol abuse is detrimental
 - GGT, MCV screening
- Effect of moderate/occasional alcohol consumption unclear
 - *Lavernia CJ. Clin Orthop Relat Res. 2013 Jan;471(1):189-94.*

Ideal patients

- **HTO** :Young, active, male with good ROM, some preservation of medial joint space and metaphyseal varus
- **Uni** : Sedentary older female with bone-on bone medial OA with correctable varus due to loss of cartilage
- **TKA**: Any patient with tricompartmental OA or inflammatory arthritis

Take home message

- Appropriate surgery for patients that fit ideal indications for each technique
- Patients without ideal parameters
 - Surgeon experience
 - Patient preference



Thank you ...

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