

Soft tissue coverage around the knee

Orthopedica Belgica

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Covering the knee

Soft tissue coverage around the knee is challenging because...

- coverage needs to be thin and pliable
- concomitant orthopaedic procedures should be anticipated
- scarring limits the use of local tissue flaps
- Receptient vessels are located deeply around the knee

Causes of soft tissue defects around the knee

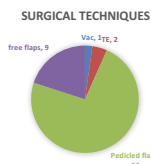
- Posttraumatic defects
- Oncological resections
- Chronic infection
- Post surgical irradiation
- Surgical release of post burn flexion contracture
- Multiple previous operations

Risk factors for soft tissue defects around the knee

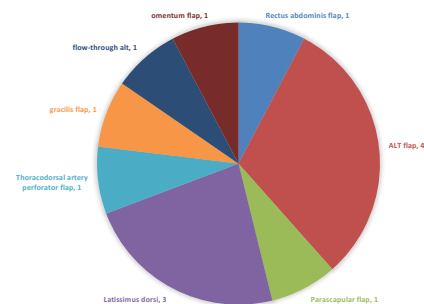
- Patient's general status (Jones et al, 2013)
- Diabetes > dehiscence and infection (Galat et al, 2009)
- Smoking > bleeding and infections (Andres et al, 2009)
- Obesity > dehiscence and DVT (Andres et al, 2009)
- Local factors (previous scars, major vessel trauma, hematoma, local infection, tension at closure, previous irradiated skin (Jones et al, 2013)

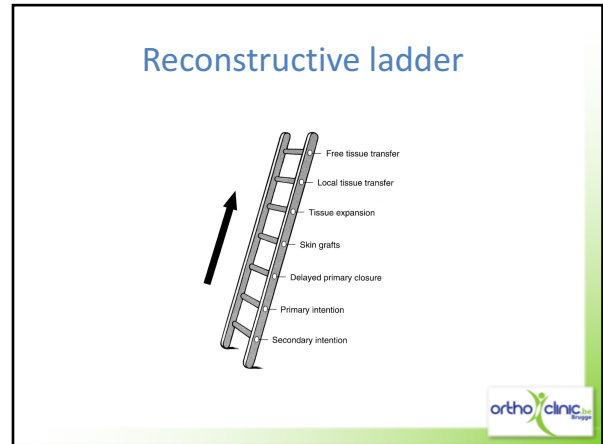
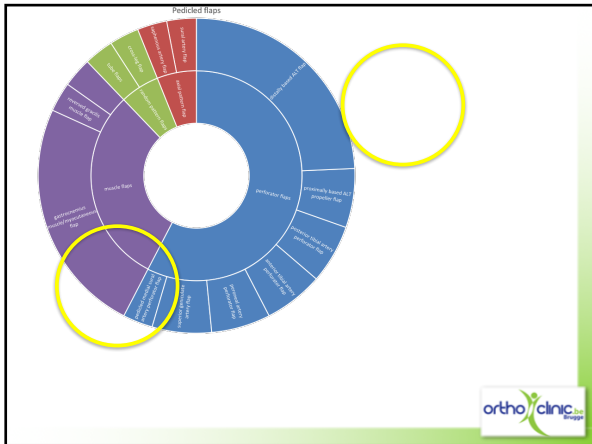
Review of the literature

- Last 10 years (2009-2019)
- Pubmed search terms: "soft tissue coverage" AND "knee"
- 45 technical papers on soft tissue reconstruction:



FREE FLAPS





Negative pressure therapy

Position on the ladder?

- reduction of edema
- increases wound perfusion
- stimulates granulation
- decreases bacterial loading
- pulls wound edges towards each other
- faster wound healing

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Negative pressure therapy

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Negative pressure therapy

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Split thickness skin graft



Day 8



Day 24



Day 40



Split thickness skin graft

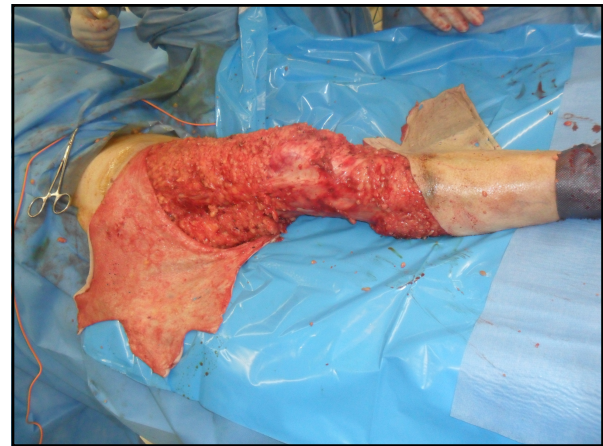


3 months



Full Thickness skin graft

1. Defatting the skin flaps
2. Cleaning – rinsing the wound
3. Thorough hemostasis
4. Perforating the graft
5. Reapplication on the wound bed
6. Treat it as a regular skin graft





Tissue Expansion

Free tissue transfer
Local tissue transfer
Tissue expansion
Skin grafts
Delayed primary closure
Primary intention
Secondary intention

Tissue Expansion

Piuzzi et al., 2018



Local tissue transfers

Free tissue transfer
Local tissue transfer
Tissue expansion
Skin grafts
Delayed primary closure
Primary intention
Secondary intention

Random flaps

- Fast
- Simple technique
- Straight-forward dissection
- Adequate local soft tissue quality necessary

Perforator flaps

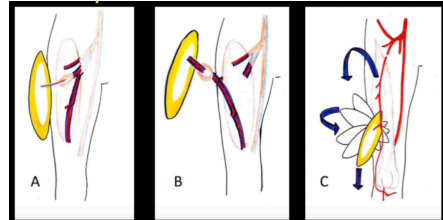


Distally based ALT flap

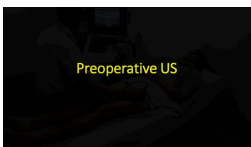


Perforator flaps

Distally based ALT flap



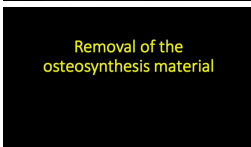
Preoperative US



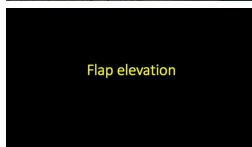
Surgical debridement



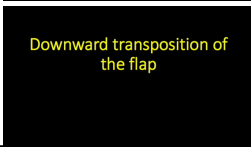
Removal of the osteosynthesis material



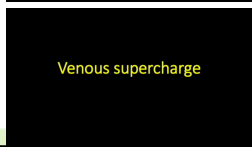
Flap elevation



Downward transposition of the flap

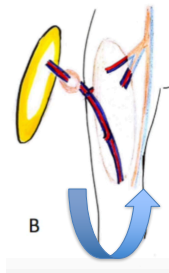


Venous supercharge



Perforator flaps

Venous congestion



Del Pinal et al.,
1993, 1998



Perforator flaps

Distally based ALT flap



Gastrocnemius flap



Cross-leg flap

Dai Chomnouy
YZW
A Helping Hand
in Cambodia



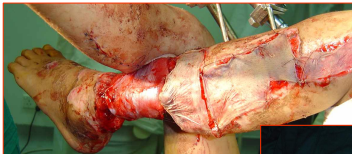
Courtesy of Prof. Vuthy – Royal Children's Hospital
Phnom Penh, Cambodia



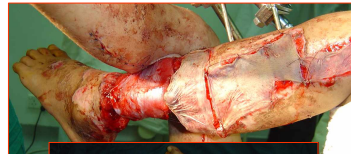
Cross-leg flap



Cross-leg flap



Cross-leg flap



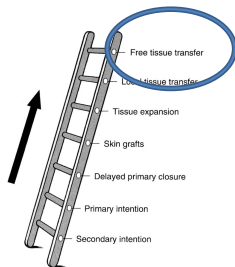
Cross-leg flap



Cross-leg flap



Free flap



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Free flap

- Deep defects
- Exposure of important anatomical structures
- No valuable local tissue flap available

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Free flap – chimaeric ALT/TFL flap



Free flap: DIEP flap



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Take home messages

- Gastrocnemius muscle flap = first choice when in need for composite soft tissue coverage
- When in doubt: perform a free flap
- Downstaging of the reconstructive ladder sometimes possible (VAC)
- Importance of patient selection and a preoperative assessment
- What is the 'best' reconstructive option?
 - Ladder!
 - Compliance patient
 - Duration of the operation

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References

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- Galat DD, McGovern SC, Larson DR, Harrington JR, Hanssen AD, Clarke HD. Surgical treatment of early wound complications following primary total knee arthroplasty. *J Bone Joint Surg Am.* 2009; 91:48-54.
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