

# **The full circle:** **primary closure of open fracture wounds**

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## **Basic speculations concerning open fractures**

- 1. Type of fixation (ex-fix, ORIF, IMN)**
- 2. Timing of wound closure (early or late)**



# Aim of the study

- To document our experience concerning the, under certain prerequisites, primary wound closure of open fractures
- Prerequisites needed  
Wound suturing with no tension applied  
Lack of wound septic environment
- To confirm the results of the late years literature relatively to the benefits of primary closure (contrary to the previous beliefs for optimal results with late closure)



# Patients - Material

- 28 patients with long bones open fractures
- Period of study: 4 years
- Wound estimation – Immediate treatment
- Broad spectrum antibiotics (2<sup>nd</sup> gen. Cephalosporin and Aminoglycoside) implementation from the moment of patient's arrival.
- Wound cultures acquisition and adaptation of chemoprophylaxis to the antibiogram as soon as possible.
- Temporary stabilisation of the fracture (Cast/ Thomas splint)
- Aseptic coverage of the wound and no wound exploration in the ER
- Wound lavage and surgical debridement of septic or non-viable tissues and bone fragments under anaesthesia (<6 h from injury)
- Surgical stabilisation of the fracture (Ex-fix, ORIF, IMN)
- Wound suturing at the time of stabilisation (no skin graft or flaps used)
- Duration of antibiotic treatment until 48 hours post-operatively



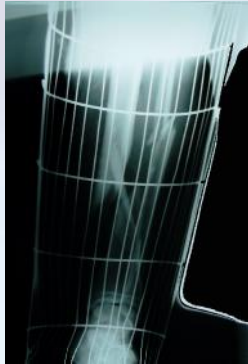
# Type of fractures

- **Two forearm fractures**  
(initial fixation with ex-fix or K-wires and final treatment with plating)
- **Five femoral fractures**  
(4 grade I & 1 grade II – all treated with IM nailing)
- **Twenty-one tibial fractures**  
(all grades I-IIIb , 16 primary nailing, 5 ex-fix transformed to nailing)

## Fractures division according to Gustilo

-	14 fractures	Grade I
-	7     "	Grade II
-	4     "	Grade IIIA
-	3     "	Grade IIIB

**Case 1**  
**28 years old male – Tibial fracture Gustilo IIIA**



**Pre-op**



**Immediately post-op**



**3 weeks post-op**

Case 2  
35 years old male – Tibial fracture Gustilo IIIB



**Pre-op**



**Immediately post-op**



**3 weeks post-op**



## Case 2

40 years old female – Distal Radius & Ulna fracture IIB



**Pre-op**



**Temporary ex-fix & K-wires stabilisation  
Final internal fixation**



**Range of Motion - 1 year post-op**



# **Results**

- **No neurovascular or deep wound infections complications were recorded in any case**
- **All fractures healed within normal time limits**
- **All patients regained almost full Range of Motion and very good functionality**
- **No cases of wound breakage noted**





## Primary wound closure benefits - Conclusions

**Patients undergoing primary wound closure returned to theatres less times than those undergoing late wound closure.**

**Patients undergoing primary wound closure had reduced hospital staying in relation to those with late closure. This resulted to:**

- a) Avoidance of in-hospital infections**
- b) Social and financial benefit**
- c) Release of theatres surgical time**
- d) Better functional results**

**Wound contaminations are due to hospital chloride rather than the initial injury**



Primary wound closure deprives germs from the environment in which they could develop.

The results of this study match with Pasteur's establishment that:

Germs alone are nothing,  
The environment in which germs develop is everything

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