01 Principles of Fracture Management – adult + paediatric

PRO TIPS

- Children have enormous re-modelling potential, but it is not magic. Beware of midshaft forearm fractures.
- Old people do not generate much callus, so minimise fracture gaps, maximise fracture stiffness and construct durability.
- If in doubt, it is unlikely that you will make a fracture too stiff.

DISCUSSION SLIDES

McMaster – Fracture Healing + Classification
OTA Resident lectures – Biology of Bone Repair
OTA Resident Lectures – The Principles and the Management of Nonunions
OTA Resident Lectures – The Growth Plate: Anatomy and Injuries

RECOMMENDED KNOWLEDGE REVIEW RESOURCES

FRACTURE HEALING

- Rockwood + Green Chapter 2a: Bone, Cartilage, and Tendon Healing p43-60
- Rockwood + Green Chapter 3a: Biologic and Biophysical Technologies for the Enhancement of Fracture Repair p61-79
- Orthobullets – Fracture Healing
- Elliott – Unified Theory of Bone Healing, BJJ 2016
- Perren – Physical and Biological Aspects of fracture healing with Special Reference to Internal Fixation, CORR 1979
- Scott – Anabolic Strategies to Augment Bone Fracture Healing, Current Osteoporosis Reports (2018) 16:289–298

BIOMECHANICS

- Rockwood + Green Chapter 1a: Biomechanics of Fractures and Fracture Fixation p1-42
- Perren – Evolution of the Internal Fixation of Long Bone Fractures, JBJSb 2002

PAEDIATRIC

- Rockwood + Green Chapter 3a: Biologic and Biophysical Technologies for the Enhancement of Fracture Repair p61-79
- Orthobullets – Physeal Considerations
- AO Surgery Reference – The Physis
- AO Surgery Reference – Post Traumatic Growth Disturbance
- AO Surgery Reference – Healing Times

ORTHOBIOLOGICS

- Jazrawi - Orthobiologics: The Wild West, VuMedi (17 mins)
- Huard - The Future of Biologics in Regenerative and Translation Musculoskeletal Care

NON UNION

- George - Risk of Nonunion with Nonselective NSAIDs, COX-2 Inhibitors, and Opioids, JBJSa 2020 [Free Article]

SCORING / CLASSIFICATION SYSTEMS

- AO/OTA

GUIDES + PROTOCOLS

MELBOURNE PAEDIATRIC FRACTURE GUIDELINES

- Guidelines

  NB you will need to select the sections from the top banner - Emergency Department, Fracture Clinic, Education, Family Resources

UK ISCP TRAUMA + ORTHOPAEDIC SYLLABUS

Knowledge

0 = No experience expected / 1= Has observed or knows of / 2= Can manage with assistance / 3 = Can manage whole but may need assistance / 4= Able to manage without assistance including potential common complications Green text = Oxford Trauma Service suggestions			
Topic	**CORE**	**ST3-ST8**	**>ST8**
Structure and function of connective tissue			
Bone	3	4	4
Pathology			
Principles of fracture healing	3	4	4
Biomechanics & Biomaterials			
Bone grafts, bone banking and tissue transplantation	1	4	4
Biomaterials	1	4	4
Genetics and cell biology			
Cellular and molecular basis of wound healing	2	4	4
Pathology			
Delayed and non-union	2	4	4
Anatomy			
Embroyology growth of bones, physeal anatomy and its application to fracture types/pathological processes and infection in particular	2	4	4
Anatomy of bones and joints in the growing child and its application to growth and deformity	2	4	4
Treatment			
Paediatric fractures (including non-accidental injury), growth plate injuries and sequelae	2	4	4

ABSTRACTS

GENERAL

- Glatt - Reverse Dynamization Accelerates Bone-Healing in a Large-Animal Osteotomy Model, JBJSa 2021
- Augat – The role of mechanical stimulation in the enhancement of bone healing, Inj 2021
- Greska – Periosteal and endosteal microcirculatory injury following excessive osteosynthesis, Inj 2021
- Mittermayr - The role of shockwaves in the enhancement of bone repair - from basic principles to clinical application, Inj 2021 [Free Article]
- Harrison - Low-intensity pulsed ultrasound (LIPUS) for stimulation of bone healing - A narrative review, Inj 2021 [Free Article]
- Kim - Do Nonsteroidal Anti-Inflammatory or COX-2 Inhibitor Drugs Increase the Nonunion or Delayed Union Rates, JBJSa 2021
- Sardesai - Base Deficit ≥ 6 within 24 h of Injury is a risk factor for fracture nonunion in the polytraumatized patient, Inj 2021
- Sniderman - Articular reductions - how close is close enough? A narrative review, Inj 2019
- Windolf - The relation between fracture activity and bone healing with special reference to the early healing, Inj 2021