paediatric osteomyelitis

a simple approach



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Treatment of bone infections in children in low-income countries – A practical guideline based on clinical cases

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Injury 54 (2023) 111066

surgery usually mandatory
antibiotics optional

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HIC: 8 /100 000
LIC: 40-200 / 100 000

tropical climate
seasonal – late summer/autumn
males > females
30-60 % post trauma
concomitant septic arthritis 30- 70%

most come late:
use of traditional medicine
socioeconomic status

most infections in healthy children

ideal situation:

multidisciplinary team
orthoplastic department
x-ray, CT, MRI, bone scan
infectious disease specialist
paediatric specialist
bone and tissue lab
nutrition support
physiotherapy

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you wish

first: is it life threatening?

acute septic child:

emergency
drain abscess,
debridement

no skin cuts over
anteromedial tibia / crest
watch skin bridges

maybe
remove necrotic bone
drill the cortex
VAC/cement/ex fix
deep tissue samples 3-5





52% long bones / femur and tibia

metaphysis within joint capsule

- proximal femur
- proximal radius
- distal fibula
- proximal humerus

rule out:

- coexisting septic arthritis
- multiple locations



most cases are chronic

key issues

simple

- stable segment
- good soft tissues
- adjacent joints not involved

complicated

- unstable bone
- soft tissue and bone defect
- joints involved

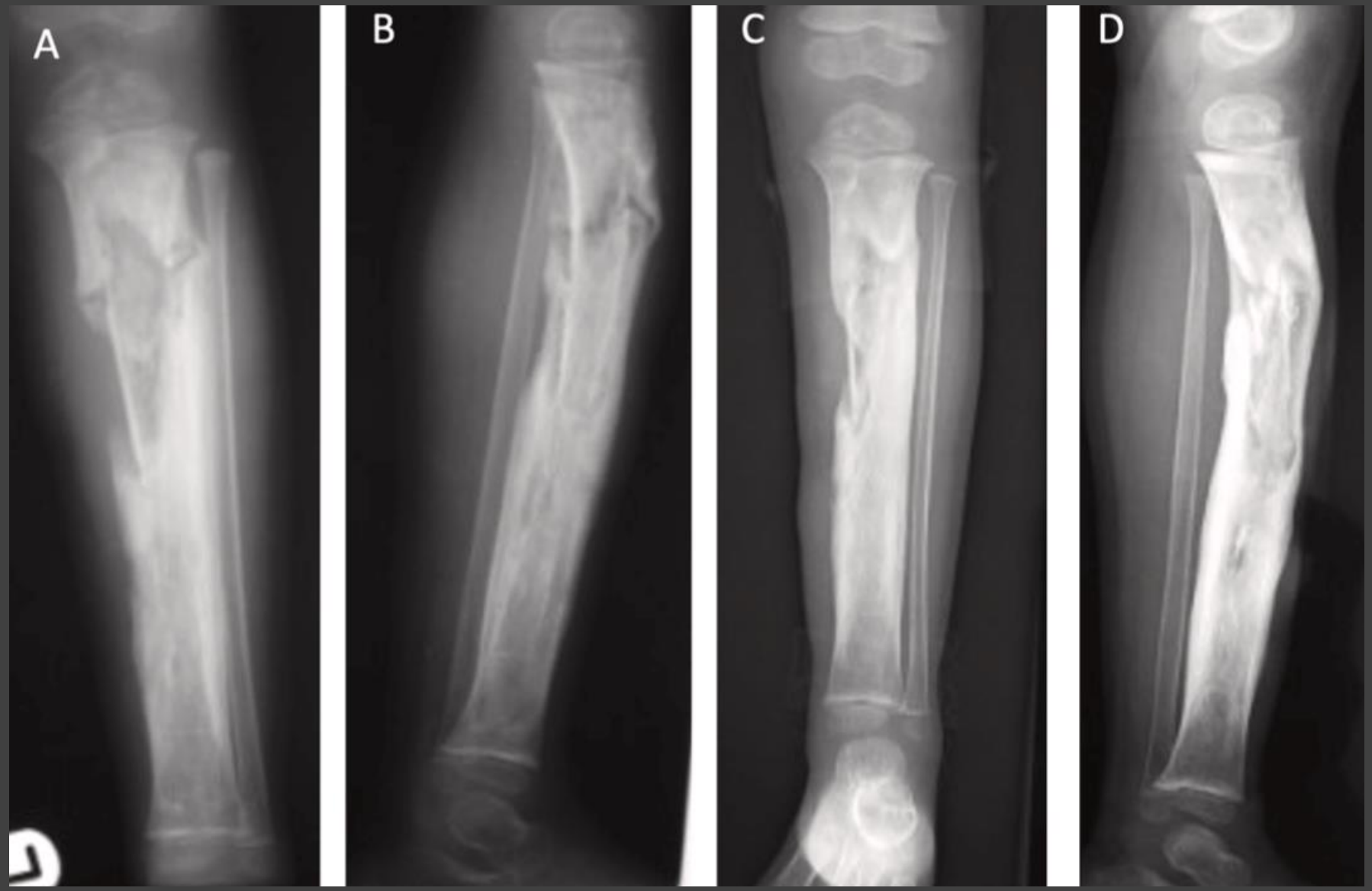
key issues

surgeon's capability
working place factors
bone healing capacity
stability of the segment
status of soft tissues
joint involvement

call a friend




A
B


A
B
C
D

less is more

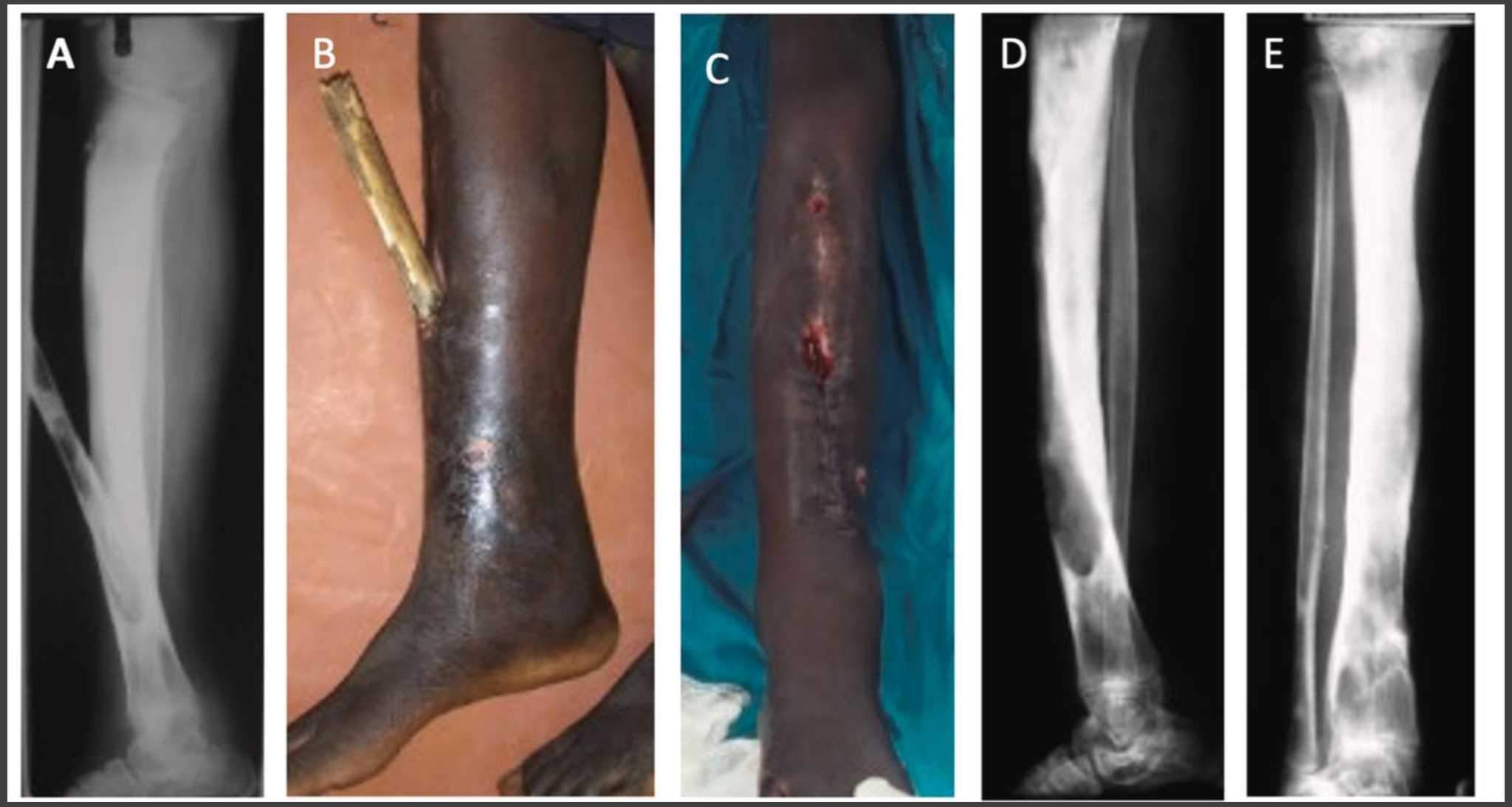
stability is key

no major operations
if not demarcated or
you cannot provide stability

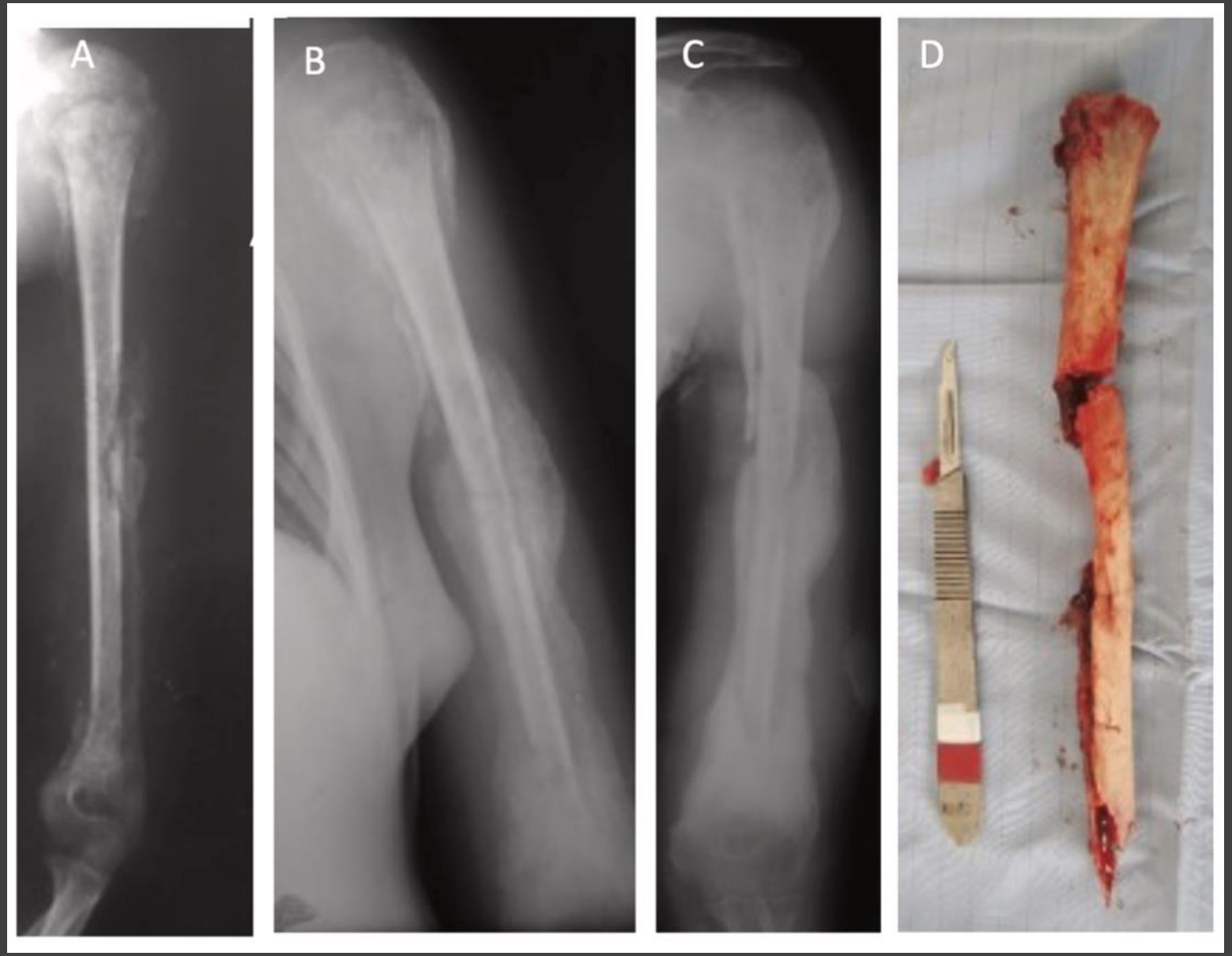
good periostal reaction - wait

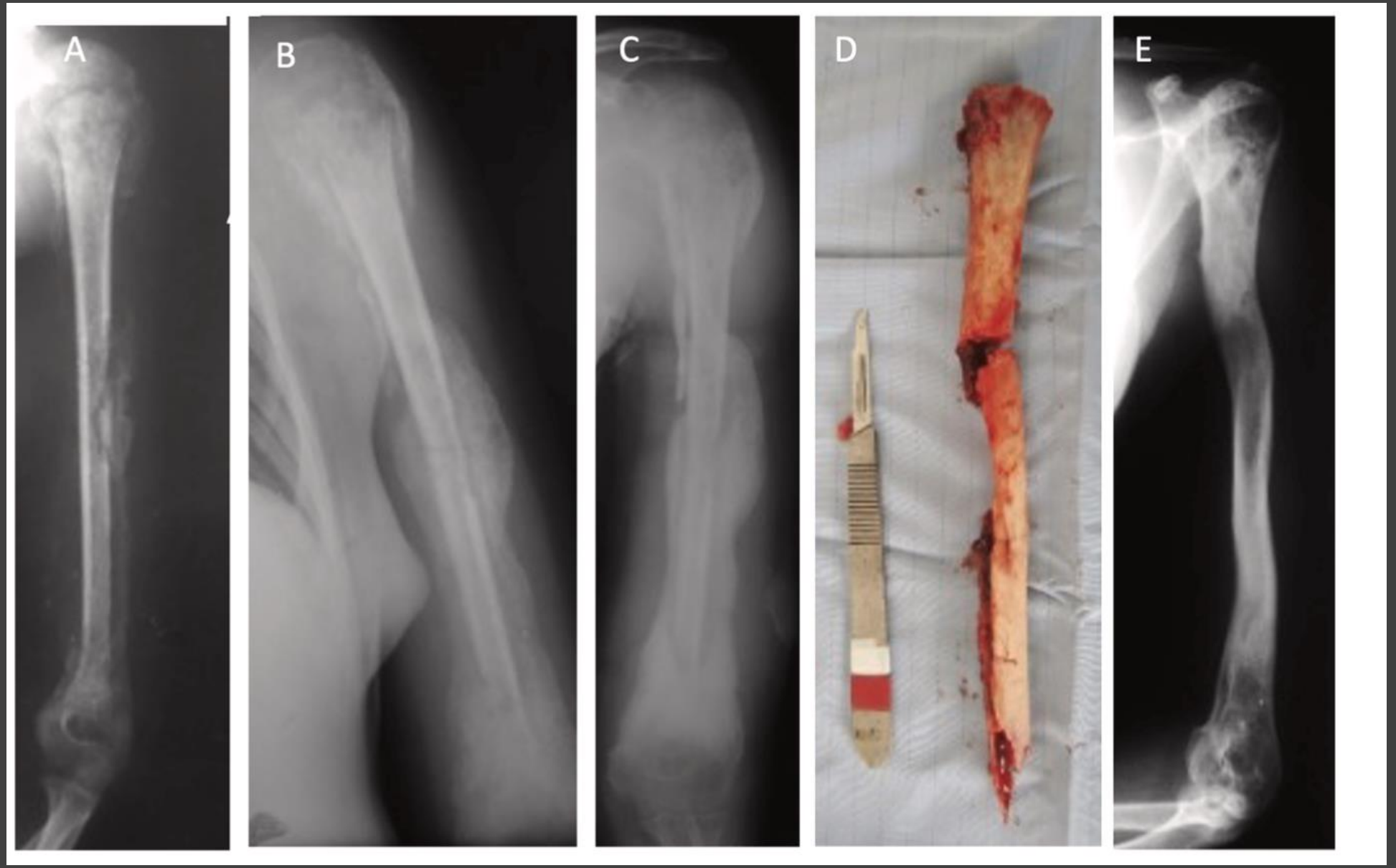

B


A
B


A
B
C
D
E

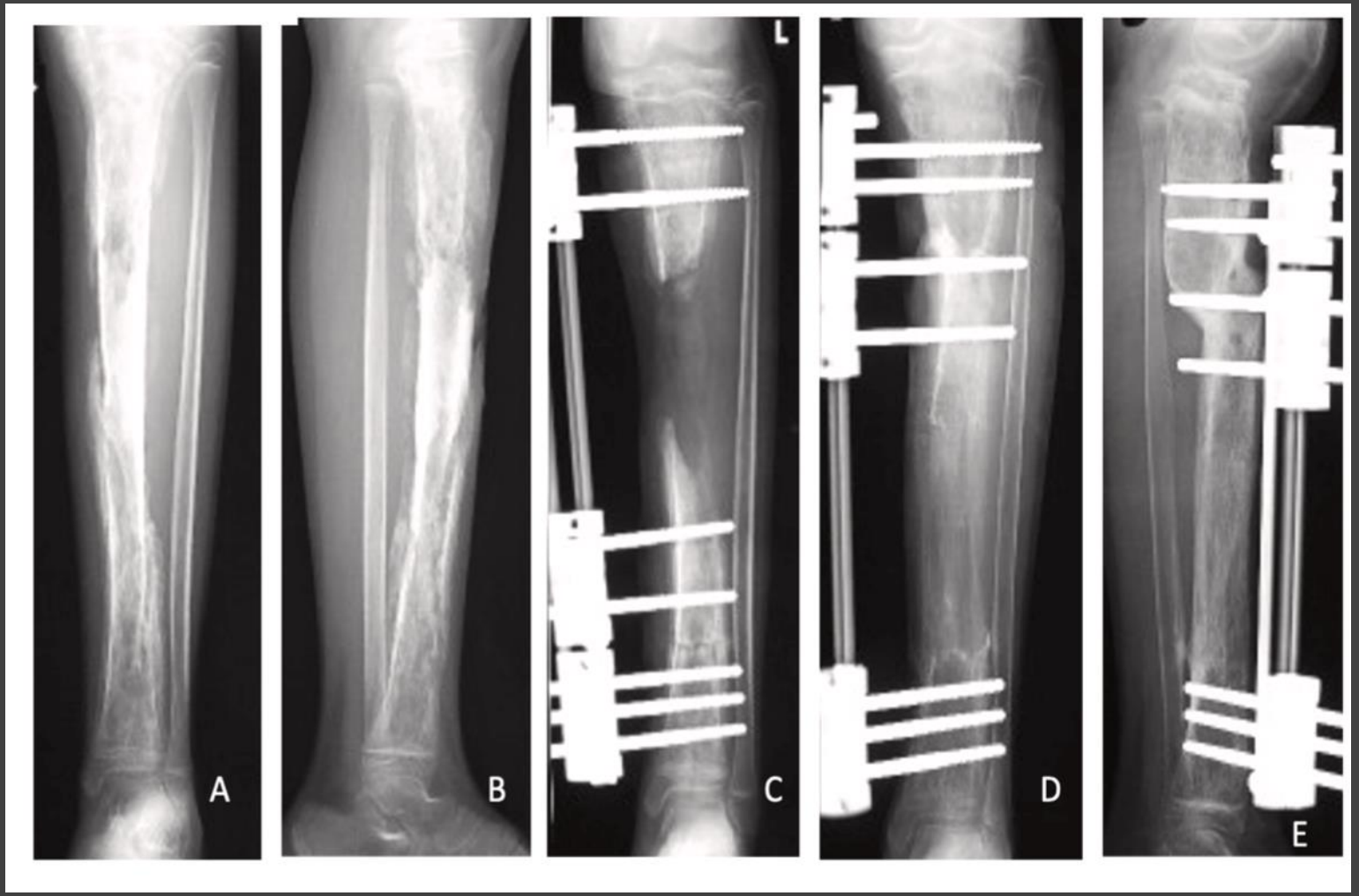

A
B

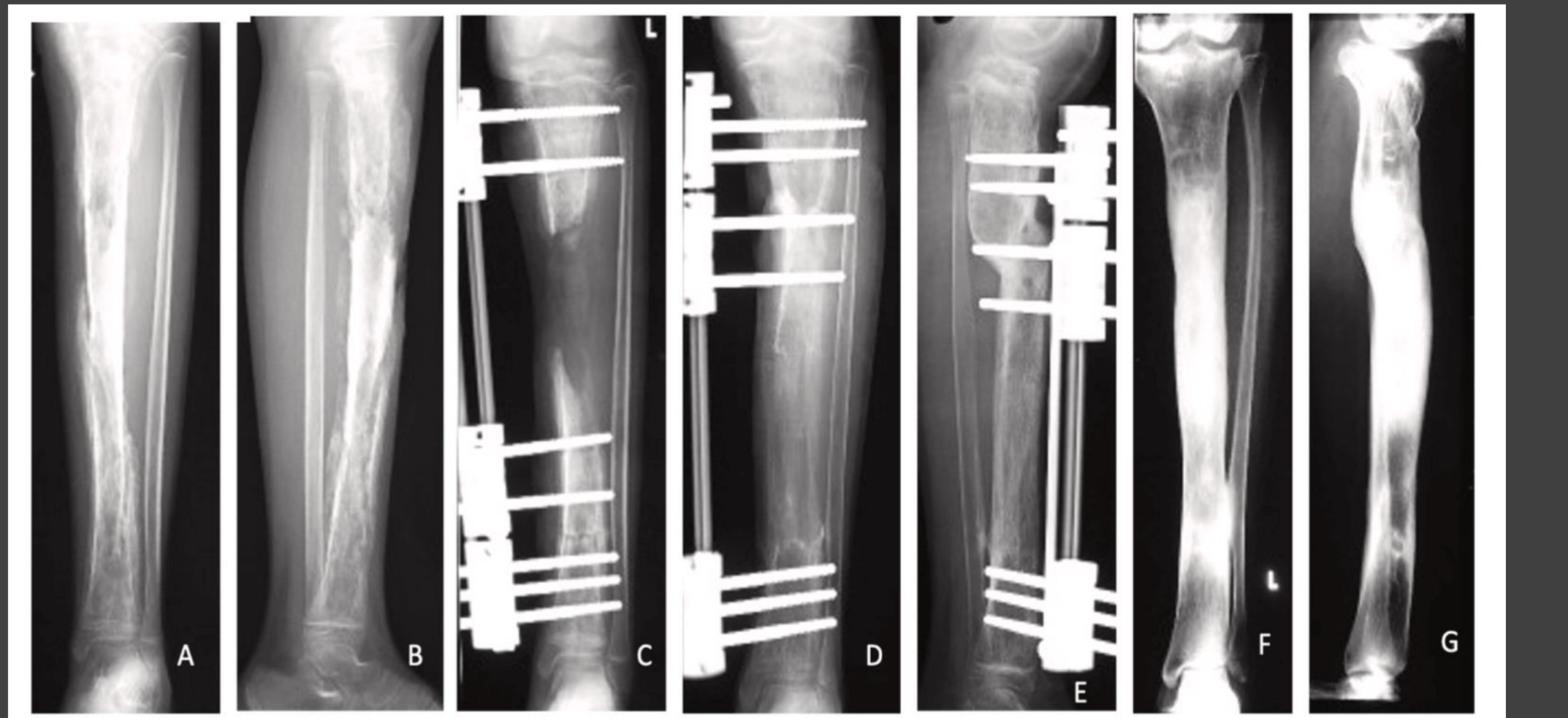

A
B
C
D


A
B
C
D
E


A
B
C


A
B


A
B
L
C
D
E


A
B
L
C
D
E
L
F
G

key points

surgery will stay the mainstay

we heal with steel. antibiotics optional

acute and sick and abscess – cut

chronic – pathological fracture – pan om – systemically well:
wait and stabilize

the periost is your friend

stability is your friend

try to make complicated cases into simple ones

however

be ready for complications

50 %

orthoplastic units



definition

blablblblblb

pathogenesis

incidence

DD

acute vs chronic

diagnosis

treatment – ab vs surgery

sequestrum involucrum

penny class

cierny

modified kocher

MULTIDISCIPLINARY!

stability is everything, as usual

acute haematogenous osteomyelitis

septic arthritis

chronic osteomyelitis

Patient Characteristics	Causative Organisms
Nosocomial infection	*S aureus*, Streptococci species, Enterobacteriaceae, Candida species
Community-acquired infection	*S aureus*, group B Streptococcus, *Escherichia coli*, Klebsiella species
Infantile (2–18 mo)	*S aureus*, *K kingae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*, *Haemophilus influenzae* type b (nonimmunized)
Early childhood (18 mo to 3 y)	*S aureus*, *K kingae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*, *Haemophilus influenzae* type b (nonimmunized)
Childhood (3–12 y)	*S aureus*, group A β-hemolytic streptococcus
Adolescent (12–18 y)	*S aureus*, group A β-hemolytic streptococcus, *Neisseria gonorrhoeae*

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sickle cell anaemia: salmonella spp - multifocal

haemophilus influenzae – non immunized

streptococcus pneumonia and pyogenes

and, of course

diagnosis

early diagnosis is key

symptoms

- fever 60%
- (localised) pain 80%
- swelling 70%
- limping / refusal to weight bear 50%
- reduced ROM 50%
- irritable

insidious - septic



diagnosis

plus:

positive gram stain / culture
positive blood culture
abnormal Xray/CT/MRI/US
abnormal clinical examination

negative cultures up to 50%

CBC
WBC
CRP
ESR



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diagnosis - imaging

X ray – often normal. necessary to exclude other pathology

CXR / cardiac echo to exclude vegetations

US – cheap, investigator dependent, fluid collections, rule out DVT

MRI – gold standard – availability

contrast CT



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Myositis Pyomyositis Congenital syphilis Acute appendicitis

differential diagnosis

inflammatory

Transient synovitis
Discitis
Rheumatic fever
Polymyositis
Juvenile idiopathic arthritis
Chronic recurrent multifocal osteomyelitis Post-infective arthralgias

coagulation disorders

DVT

tumours

bone pain

leukaemia
Vit A deficiency
fractures

sickle cell anaemia

bone infarction
AVN

treatment

always multidisciplinary
ortho – paeds – ID – nurse – physio – social worker

empiric iv AB (after blood culture / samples)
dependent on regional situation / availability

source control - drain abscess, DBR, remove necrotic bone

always drill the bone

targeted AB

CRP to monitor course

IV AB until CRP < 20 mg/dl, then oral, total 6 weeks



chronic



general rules:
acute and sick and abscess – cut
chronic – pathological fracture – pan om – systemically well – wait and stabilise

as usual it’s up to us





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