GROWTH MODULATION VS. OSTEOTOMY &

LESSONS LEARNED

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DISCLOSURES

- Editorial board- JBJS, JLLR
- Springer Deformity Textbook

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Pediatric Lower Limb Deformities

Principles and Techniques of Management

Springer



GROWTH MODULATION VERSUS OSTEOTOMY



Growth modulation



Osteotomy







- Correct skeletal deformity
- Reestablish joint orientation angles
- Equalize LLD by skeletal maturity
- Preserve function
- Minimize morbidity



GUIDED GROWTH

- Biologic
- Compressive forces inhibit growth
- Need growth remaining
- Time sensitive
- Can be reversible
- May rebound
- Can use for managing angular deformity & LLD
- Quick recovery















OSTEOTOMY

- One-shot deal
- Allows multiplanar correction
- Acute versus Gradual
- Can lengthen/shorten
- Often needs hardware
- Can address intraarticular/ torsional deformities
- Longer rehab (cf. guided growth)





WYSIWYG

What You See Is What You Get



7 Y.O. WITH RECURRENT DEFORMITY









I YEAR LATER

CT SCAN: PHYSEAL BAR

MEDIAL PLATEAU ELEVATION (WITH PROXIMAL TIBIAL/ FIBULAR EPIPHYSEODESIS)

Guided growth needs growth remaining

8-YEAR-OLD, OPEN INJURY –"NO FX" RECURRENT VARUS – DESPITE OSTEOTOMIES

15 YR OLD WITH SHORTENING/DEFORMITY

TWO OSTEOTOMY SOLUTION WITH TRANSLATION

OR

b

Early F/U

OSTEOTOMY PLANNING

If the osteotomy passes through a different level than the Apex, then angulation and translation are required to realign the bone.

Paley

FOLLOWING FIXATOR REMOVAL

Watch out for perichondrial injury

OPEN TIBIA FRACTURE

Hospitals

I YEAR FOLLOW-UP

Make decisions based on clinical exam, not imaging alone

RECURRENCE ABC WITH GENU VALGUM GUIDED GROWTH

6/08

12/08

6/10

9/11

S

Think Biology, Not just Technology

I I YEAR MALE FELL OVERSEAS, 2 WEEKS EARLIER

UCSF Benioff Children's Hospitals

12/06

DIFFUSION-TENSOR IMAGING

- MRI-based techniques to predict height velocity and growth potential
- Depicts diffusion through the columns of cartilage and newly formed bone as directionally colored tracts
- Greater tract length and volume when growth is fastest
- Differentiate normal from abnormal growth
- Better indicator of physeal dysfunction than 3D volumetric measurements
- May predict height velocity more accurately and precisely than current bone age-based methods
- Potential biomarker for growth velocity

https://www.columbiaradiology.org/research/skeletal-growth-imaging-lab/skeletal-growth-study

Address problems before they become irreversible

I 0 YR. OLD FEMALE WITH SALTER 2 DISTAL FEMUR FX.

2 YRS. POST INJURY...

Not every flexion deformity is a "contracture"

3.5 YEARS POST INJURY...

9/5/19

REMOVAL EX. FIX- FEB 2020

6.5 YRS. POST INJURY...

LENGTHENING WITH ANTEGRADE NAIL

Last day of distraction

Straighten the bone first, and then equalize leg lengths (same device or later)

7 YR. OLD WITH BLOUNT DISEASE (R>L)

dren's

MISSED FEW APPOINTMENTS.....

IT'S NOT OVER YET!!

MEDIAL PLATEAU ELEVATION LEFT SIDE

AT SKELETAL MATURITY

It's not over till it's (growth) over

THANK YOU

← → C

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