Sacroiliac and Temporomandibular Joint Arthritis

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Parent Session

“the under-recognized joints”
Goal:

overview of these under-recognized joints

- Sacroiliac Joint (SIJ)
- Temporoandibular Joint (TMJ)

- May be under recognized in JIA/ERA
  - May have vague/no symptoms
  - Symptoms may get explained as something else
  - When diagnosed late
    - Can be more difficult to treat
    - May get joint related complications

- Review general concepts of autoimmunity
- Anatomy and clinical features of these conditions
- Treatment options

Dr Ruiz:
- OMFS perspective (TMJ)
To further understand these INFLAMMATORY conditions, need to look at:

“army” = white blood cells

“weapons” = Anti-bodies and inflammatory proteins

Components of the immune response:
Autoimmune “inflammatory” diseases have an imbalance in their immune response.

- Immune system gets “confused”
- Becomes “overactive”
- Attacks SELF
  - Thinks there is an infection

Immune Cells

Antibodies & Inflammation Proteins (cytokines)
- TNF, IL1, IL6

Can lead to erosion
End result......

“showering of inflammatory proteins”
Part 1

Sacroiliac Joint
(SIJ)

“Sacroiliitis”
Sacroiliac Joint:
Relevant Anatomy

Upper Portion = Fibrous

Lower Portion = Synovial (joint lining)

target of arthritis “sacroiliitis”
Sacroiliitis is part of “ERA”

• Sacroiliitis is most commonly seen in:
  – “Enthesitis Related Arthritis” (ERA)
    • Category of JIA with both Arthritis & Enthesitis
      – “Sacroiliitis” = inflammation of Sacroiliac Joint (SIJ)
      – “Enthesitis” = inflammation of the area where tendons insert onto bones
  – 4 subtypes of ERA
    • Juvenile anklyosing spondylitis
    • Psoriatic arthritis
    • Inflammatory Bowel Disease (IBD) related arthritis
    • Reactive arthritis (post infectious)
Other causes of SIJ/Lower back pain:

- Inflammatory
  - Autoimmune*
  - Infection
  - TB

- Injury/strain
- Fracture
- Disc problems
- Posture
Symptoms of sacroiliitis

• Lower back pain
• Butt pain
• Leg Pain
• Lower back stiffness
• Poor flexion
Physical Exam:
Limited lower spine flexion from sacroiliitis

-Flat back (loss of lower curve)

-Difficulty bending to touch toes
Family History
HLA-B27 gene

- HLA-B27 is a gene
  - When present may produce arthritis causing proteins

- HLA-B27 is present in
  - < 10% of the general population
  - > 90% of patients with ERA
    - Genetic predisposition for
      - ERA and sacroillitis
      - Acute iritis (red painful eye)
Imaging: diagnose & follow response to treatment
MRI-helpful for early inflammatory findings & erosions

Inflammation
Edema

Erosion
X-ray changes are seen later

Joint **widens** and becomes sclerosed*

(*increased density of the bone around the joint—causes stiffness)
Late “ankylosing spondylitis” as an adult (fused spine)

- Fusion of lower (lumbosacral) vertebrae and straightening of the lower spine
  - ‘Bamboo’ (straight) appearance (arrow)
  - Rare in kids
  - Complication in adulthood if not controlled
Without effective treatment: Progression seen in adults over time

Loss of lower curve (sacroiliitis) and straight (bamboo) spine

Prevent this!!
Treatment Options for JIA/ERA: possible immune targets

“The Army”
White blood cells

“The Troops”
macrophages

Inflammatory proteins

B-Cells

Antibodies

T-Cells

“The General”
Gives orders to B cells & other inflammatory cells

***Multiple targets for treatments by blocking specific areas of the immune system
key inflammatory proteins associated with arthritis

The Weapons:  
IL-1, IL-6, and

TNF = Tumor Necrosis Factor  
- (TNF = main one for sacroiliitis)
- In the body they help destroy tumors and fight infections
  - In JIA they destroy the joints
  - Currently, they are a target for treatments
**Targets of Immunosuppression**

Cell blocking drugs:
- Methotrexate
- Steroids
“blanket of immunosuppression”

Biologics:
“Soak up” or “block”

**Inflammatory proteins:**

- Biologics:
  - TNF-α > Enbrel, remicade, humira (sacroiliitis)

Other biologics used in JIA block:
- IL-1 > anakinra, Ilaris, rilonocpet
- IL-6 > actemra
“Biologic agents”

• Drugs which mimic substances already present in the body
  – Antibody-like molecules

• Anti-Body:
  – Immune protein
  – Recognizes foreign substances
  – Binds to and removes
Treatment for Sacroiliitis

**Medications**
- NSAIDs (pain, stiffness)
- Steroids (oral, IV or inject)
- Methotrexate
  - May be used if other joints involved
- Biologics
  - Anti-TNF

**Rehab:**
- Physical therapy
- Pool therapy

**SIJ Injection**
- Intra-articular
- Put the medicine “in the joint”
  - Steroid
  - Lidocaine
MRI sacroiliitis (pre/post remicade)

Sacral edema
Erosions
Cysts

Improved on Remicaide
Treatment Goals

- Improve Quality of life
- Prevent or cure complications
- Clinical Remission (restore and maintain)
  - Defined by:
    - No evidence of active disease by:
      - Clinical symptoms, MD exams, labs, radiology
  - 2 scenarios:
    - On meds
    - Off meds
  - Difficult to predict
  - Research underway
Side Effects of Meds

**Infection**
- Remember to tell other providers that you are on immunosuppression
- If fever, see PMD

**Infusion reaction**
- Premedicate
  - Tylenol, benadryl, steroids
  - Epi at bedside

**Malignancy**
- Anti-TNFfi higher risk
- Greater issue in adults and in combination with other meds
- Duration of treatment
- Med watch reporting

**Autoimmune response**
- Especially for remicade
  - Lupus antibodies
  - Remicade antibodies
  - Can affect efficacy of medication
Part 2

Temporomandibular Joint (TMJ)
Anatomy of TMJ (Temporomandibular Joint)

- Hinge (open/close) and Gliding (slides)
  - Most commonly uses joint
    - ~2,000 x/day
    - Talk, eat, yawn

- Disc (cushion)
  - absorbs stress
  - eases movement

- Bony portions (Fossa-top & Condyle-bottom)
  - Growth plate is below condyle
    - below thin layer of cartilage

- Synovium
  - biologic membrane that lines it
  - ***target of JIA

- Muscles move it
Importance

- 30-50% of JIA patients have TMJ arthritis

- Not routinely screened (esp if not symptomatic)
  - not officially recommended (if treating JIA, jaw might also respond)

- Frequently asymptomatic (may get missed)
  - “normal TMJ exam” early on

- Unique anatomy and biochemical composition
  - Make it susceptible to arthritis
  - Growth plate is below condylar head
    - below thin layer of cartilage
    - Inflammation / trauma over time can lead to growth disturbances
      - Micrognathia (small lower jaw)
      - Decreased chewing ability (difficulty opening mouth)
      - Malocclusion (bite is off)
TMJ Terminology

**TMJ Dysfunction**

- Non-inflammatory
- Pain and dysfunction of:
  - Muscles that move the jaw
  - TMJ structures (joint, disc)
    - resulting in pain and limited movement
- Possible Causes:
  - Post-traumatic
    - Grinding
  - ?Malocclusion (problems with bite)
  - Genetic/Hormonal predisposition
  - Idiopathic (unknown)

**TMJ Arthritis**

- Osteoarthritis (degenerative):
  - most used joint in the body
  - “wear and tear”
- **Synovitis (inflammatory)**
  - JIA related:
    - Auto-immune mediated damage
  - Fluid in joint
  - Joint surface inflamed
TMJ Symptoms:
pain can radiate to other places

- Headaches
- Eye pain
- Difficulty opening mouth
- Ear & Jaw pain
- Neck pain
Clinical Features:
-changes can occur slowly over time (late finding)

Asymmetric Jaw

Small, recessed lower jaw (micrognathia)

TMJ involvement with growth failure of lower jaw
Clinical Features

Dental crowding

Difficulty opening mouth

May be associated with bone loss
Diagnosis and Risk Factors

**History & Physical**

- **Pain & Stiffness**
  - jaw or surrounding structures
- **Type of JIA**
  - Systemic or poly-JIA
  - Longer duration
- **Misalignment**
- **Difficulty opening mouth**
  (range of motion)
  - Measure **MIO**
  - Higher predictive value
  - May be associated with bone loss
  - Late finding

**Labs**

- No association specifically with: HLA-B27, ANA, RF, CCP

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**MIO:**
Maximal Incisal Opening:
Distance between the upper and lower teeth edges (normal is about 3cm)
**Imaging**

**has an important role to diagnose b/c may be asymptomatic**

**helpful to determine extent of damage**

- Panorex (3-D view: x-ray of jaw form ear to ear)
  - Only sees “bone damage” (condyles)
- CT/iCAT
  - Can see damage to condyles
  - Quick and lower radiation w/ iCAT
  - May miss early or active disease
- TMJ Ultrasound
  - Not readily available (operator dependent)
  - Can see fluid and inflammation
- MRI with contrast (most sensitive to detect)
  - Contrast can show inflammation of synovial lining, fluid or erosions
    - Helps to differentiate active from chronic
  - Younger kids might need sedation
- Bone scan
  - Nuclear medicine scan that can “light up” inflammation
Abnormal MRI showing TMJ arthritis

Synovial inflammation

Erosion
Bone Scan
picks up bone inflammation
Treatment Options

**Medical**

- **Systemic**
  - Medications used to treat JIA
    - Steroids
    - Methotrexate
    - Biologics (based on JIA subtype)

- **Intra-articular options**
  - Put the medicine “in the joint”
    - Steroid injections
      - Risk if not inflammatory
    - Off-label/investigational
      - Biologics

**Other**

- **Rehab** (usually reserved for TMJ dysfunction)
  - Mouth guards/splinting
  - Physical therapy

- **Surgical**
  - To correct poor mandibular growth
  - Synovectomy to control arthritis
  - Dentist, interventional or OMFS to inject TMJ

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Thickening & inflammation before steroid injection

Resolved after Steroid injection
TMJ Monitoring

Monitoring
• Symptoms
• Physical Examination (mouth opening)
• Pictures
• Imaging
• Labs

Specialists Involved
• Rheumatologist:
  – Physical examination
  – Medical treatments
• PT:
  – Rehab exercises
  – Mouth Guards
• Dentist:
  – Monitoring MIO
  – Panorex
• OMFS:
  – Surgical options........
Summary

• TMJ and SIJ are under-recognized due to vague symptoms
• Imaging is an important to pick it up early
• MRI is most sensitive and gives useful information that can be followed for treatment
Temporomandibular Joint Involvement in JIA: Maxillofacial Perspectives

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Temporomandibular Joint (TMJ) Involvement in Juvenile Idiopathic Arthritis (JIA)

- Reported prevalence of TMJ involvement in JIA is variable; from 15-70%.
- May be asymptomatic.
- Negative consequences of JIA;
  - Pain
  - Limited function
  - Mandibular condyle destruction
  - Impaired growth
  - Functional consequences (chewing, speech, airway)
The TMJ in JIA: Treatment Objectives

• During active growth:
  • Reduce pain
  • Improve/maintain jaw function
  • Reduce TMJ (Condyle) destruction
  • Can we prevent secondary jaw deformity?

• At Skeletal Maturity:
  • Correct Jaw Deformity for improved function and morphology
  • Joint reconstruction or replacement??
The TMJ in JIA: Treatment

• Medical therapies

• Surgical Options:
  • Joint related:
    • Intra-articular injection
    • Arthrocentesis
    • Arthroscopy
    • Open Joint procedures
    • Joint replacement surgery (autogenous or prosthetic)
  • Corrective jaw surgery
    • Upper jaw, lower jaw, chin surgery
    • Done to correct facial deformity or bite relationship
The TMJ in JIA: Treatment

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TMJ in JIA: Treatment

Arthroscopy of the TMJ

- 40% Protruded Disk Roofing (Anterior Displaced Disk)
- Synovium of Posterior Pouch
- Fibrocartilage Scuffing (Moderate Articular Surface Degeneration)
- Synovium Adhesions
Arthroscopy of the Temporomandibular Joint in Children with Juvenile Idiopathic Arthritis
Abramowicz, S

• Retrospective review over 5 years
• Confirmed diagnosis of JIA
• Failed anti-rheumatological medications
• TMJ Pain
• Limited TMJ Range of motion
5 joints (3 patients) underwent arthroscopy
All patients had synovitis and chondromalacia
All joints injected with steroid at the time of arthroscopy.
All had improved ROM!
1 patient had resolution of pain
TMJ in JIA: Treatment

Arthrocentesis
Intra-articular Steroid Injection
Effect of Arthrocentesis and Local Steroid Injections in the Temporomandibular Joint in Children with Juvenile Idiopathic Arthritis

Oslen-Bergen, H.

- Arthrocentesis & Intraarticular steroid injection
- 21 patients (15 girls, 6 boys)
- Mean JIA duration of 5 years
- Mean TMJ pain/limitation of 2.1 years
- Randomly assigned to arthrocentesis or arthrococentesis/steroid
Effect of Arthrocentesis and Local Steroid Injections in the Temporomandibular Joint in Children with Juvenile Idiopathic Arthritis
Oslen-Bergen, H.

- Significant improvement in subjective findings (pain, function) and objective findings (mean mouth opening) in all patients.
- Pain (VAS) from baseline of 49 to 18
- Maximum opening from 26.7mm to 40.4mm
Effect of Arthrocentesis and Local Steroid Injections in the Temporomandibular Joint in Children with Juvenile Idiopathic Arthritis

Oslen-Bergen, H.

• Both groups (with and without steroid) demonstrated equivalent improvement
• Improvements lasted for months
• TMJ improvements did not seem to be affected by fluctuations in the disease in general.

- Chart review of 192 patients with JIA at a single children’s hospital 2008-2010
- MRI with contrast
- 63 patients underwent intra-articular steroid injection (0.5ml aristospan per TMJ)
- Data collection; age, JIA subtype, immunosuppressive therapy, MIO, MRI changes, complications.
MRI evidence of TMJ arthritis in 46%
- Lower than expected
- All JIA subtypes had similar rates

Only 47% of the patients with MRI findings complained of pain.

Steroid injections by OMFS
63 patients received injections
- 66% improved opening (MIO)
- 27% decreased
- 7% no change

Post-Injection MRI 6 months later:
- 51% improved
- 21% of patients reported symptom relief after steroid injections
The TMJ in JIA: Treatment

• **Medical therapies**

• **Surgical Options:**
  • **Joint related:**
    • Intra-articular injection
    • Arthrocentesis
    • Arthroscopy
    • Open Joint procedures
    • Joint replacement surgery (autogenous or prosthetic)
  
• **Corrective jaw surgery**
  • Upper jaw, lower jaw, chin surgery
  • Done to correct facial deformity or bite relationship
Condylar Resorption & Skeletal Deformity

- TMJ involvement may lead to:
  - Destruction of condyle
  - Decreased mandibular growth/deficiency

- Morphology (facial form) is affected:
  - Mandibular deficiency, retrognathia
  - Anterior open bite
  - Secondary vertical maxillary excess

- Functional Consequences
Orthognathic Surgery

- Ideally, skeletal correction is delayed until growth is nearing completion.
- Presurgical Orthodontics → Surgery → Postsurgical Orthodontic Detailing
Orthognathic Surgery: Diagnosis and Treatment Planning
TMJ Destruction in JIA: Is there a role for Joint Replacement Surgery???
TMJ Destruction in JIA: Is there a role for Joint Replacement Surgery???

• Joint replacement surgery (autogenous grafts and/or prosthetic) may be useful in select cases.

• More frequently, patients can undergo conventional orthognathic (corrective) jaw surgery without joint replacement.

• *If the joints are stable, functional, and asymptomatic, then do not replace.*
Early therapy is directed at decreasing/preventing joint (condyle) inflammation/damage

Serial Panoramic radiographs (Bone)

Serial MRI (soft tissues/joint structures)

Growth surveillance & early Orthodontic consult

Arthrocentesis & Intra-articular steroid injection

Preservation of the condyle
  - Maintains mandibular growth

Can steroid injections preserve condyle & growth?

Can we prevent the need for subsequent jaw surgery??
Thank You