Activity Patterns in Three Mid-1800’s Illinois Populations:
An Analysis of Biomechanical Stress on the Skeleton

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Labor-Activity Studies

Examination of skeletal remains for pathological patterns related to lifestyle or occupation [1, 2]

Repetitious or strenuous activities often manifest on the skeleton [1, 2]

• Relevance [1, 2]
  – Bioarchaeology
  – Forensic anthropology

• Limitations [1]
  – Sample sizes and fragmentary remains
  – Unknown variables
Activity-Related Pathologies

- **Arthritis** [2, 3, 4]
  - Lipping
  - Porosity
  - Osteophytes

- **Enthesopathies** [1, 2, 5]
  - Irregular Margins
  - Porosity
  - Enthesophytes

- **Bilateral Asymmetry** [6]
Populations

- Channing School, Elgin  
  - 2 individuals

- Old Darwin Cemetery  
  - 3 individuals

- Kaskaskia Island Cemetery  
  - 7 individuals
Methods: Skeletal Analysis

- Sample selection [1]

- Data collection of pathologies according to standard methods, and consultation with a professional in the field [1, 2, 3]

- Analysis of skeletal data in Excel
Methods: Historical Records

• U.S. Federal Census Records \([7, 8, 9]\)

• Historical references \([10, 11]\)

• Analysis of census data in Excel
Skeletal Analysis Results

Most common pathologies
Enthesopathy of the Ligamentum Flavum
- ligament that runs along inside of vertebrae
- aids in resuming upright posture after flexion

Schmorl’s Nodes
- compression of vertebral body due to stress on the spine
**Pectoralis Major**

Enthesopathy

-Movement of the shoulder: raising arm, twisting arm

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**Brachialis**

Enthesopathy

-Flexation of the elbow, assists the *biceps brachii* muscle

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**Costoclavicular ligament**

Enthesopathy

-Limits movement, stabilizes the shoulder joint
### Skeletal Analysis Results

- **Most prevalent pathologies:**

<table>
<thead>
<tr>
<th>Pathology Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal enthesopathy of the ligamentum flavum</td>
<td>87% (N=8)</td>
</tr>
<tr>
<td>Moderate arthritis of the femur joints</td>
<td>62% (N=8)</td>
</tr>
<tr>
<td>Spinal Schmorl's nodes</td>
<td>55% (N=9)</td>
</tr>
<tr>
<td>Enthesopathy of the pectoralis major muscle</td>
<td>44% (N=9)</td>
</tr>
<tr>
<td>Mild to moderate arthritis of the hip joints</td>
<td>40% (N=10)</td>
</tr>
<tr>
<td>Enthesopathy of the brachialis muscle</td>
<td>37% (N=8)</td>
</tr>
<tr>
<td>Enthesopathy of the costoclavicular ligament</td>
<td>37% (N=8)</td>
</tr>
</tbody>
</table>
Skeletal Analysis Results

• 100% of comparable elements from all samples showed bilateral asymmetry of pathologies
Census Records

- Recorded each occupation listed and number of repetitions

- Lumped into four categories according to innate groupings and labor types:
  1. Farmers
  2. Laborers
  3. Craftsmen
  4. Light labor

- Women were grouped according to occupations listed when available
Population Comparison
Elgin Records

• Identity of individuals known [12]

• Mary Ann Kimball [10]
  – Strong activity markers
  – Second family to move to Elgin (pioneers)

• Calvin “Deacon” Carr [11]
  – Strong activity markers
  – Moved frequently
  – No set occupation
Conclusion

• Populations were very active
  – All types of pathologies found in all samples

• Asymmetry is further support that pathologies were labor-caused

• Even distribution
  – Probably due to the high prevalence of heavy labor in the populations

• Information about the lifestyle of an average person living in Illinois during the mid-1800’s
References


Images


All other images used in this presentation were taken during data collection by the presenter.
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