causation in Workers Compensation

Musculoskeletal Disorders based upon Guides to the Evaluation of Injury and Disease and Injury by Melhorn and Ackerman, AMA Press, 2008

by

David A Goodman MD MPH
Board Certified in Occupational Medicine
Specializing in Medical Evaluation of
Workers Compensation Claims
Staff Physician, Prevea WorkMed, Green Bay, WI
Purpose:

To assist workers compensation claims professionals in better understanding medical causation analysis

Basis of medical causation opinions

- Individual clinical findings
- Individual workplace exposures
- The literature linking (or not linking) the exposure of concern and the condition in question
scope of the problem

- WC Healthcare costs greatly escalating:
  - >$400 billion direct costs
  - >$800 billion indirect costs
  - >$1.2 trillion total costs

- Musculoskeletal disorders as a group has seen the largest increase:
Doctor, I feel funny

Well, you look ridiculous to me!
Fraud

- Up to 25% of all WC claims (per insurance fraud industry estimates)
- Most fraud involves some type of malingering in which claimant may extend time off work even though injury/condition has healed sufficiently to allow safe return to work
- Limited resources to investigate fraud
- Most investigations involve injuries thought not to have occurred at work and claimants working while collecting benefits (about 10% of all claims filed).
Many Guises of Fraud

- claimant tries to mislead physician
- In one study, 42% of subjects were not truthful on a test of memory.
- Exaggeration of cognitive symptoms is widespread in disability related evaluations.
- Unwise to accept self-reported memory complaints at face value.
- Symptom Magnification
Definitions

- Evidence Based Medicine
- Epidemiology
- Types of injury
- Workplace physical factors
- Risk Factors
Evidence-based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients...integrating individual clinical expertise with the best available external clinical evidence from systematic research.

Problem: good systematic research is very uncommon and difficult to perform in the workplace.

Most data is derived from epidemiologic studies which are limited by their nature.
Epidemiology

- The biomedical discipline focused on the distribution and determinants of disease in groups of people who happen to have some characteristics, exposures, or disease in common.

- Basic scientific foundation of public health.

- Observational versus experimental

- Goal is to identify factors associated (positively or negatively) with the development or recurrence of adverse medical conditions.
Types of Injury

- Specific Wisconsin causation terminology:
  - Direct Injury (e.g. acute traumatic injury)
  - Indirect Injury (often considered occupational disease)

  - precipitation, aggravation, acceleration of a pre-existing progressively deteriorating and degenerative condition beyond usual and normal progression

  - appreciable period of workplace exposure being the sole cause or at least a material and substantial contributing cause to the onset and development of the condition
Workplace Physical Factors

- force
- repetition
- posture
- vibration
- temperature
- contact stress/unaccustomed activities
Risk Factors

• Risk is the probability an event/disease/injury will occur after a particular exposure

• Risk factor may be environmental, behavioral or biologic
  
  • If present, directly increases the probability a condition will occur
  
  • If absent or removed, reduces that probability

• Many diagnoses are multifactorial making causation analysis complex: individual susceptibility, genetic disposition, repeated exposures, latency, etc.
Determination of Work Relatedness

- Medical Causation versus Legal Causation
  - Two distinct concepts
  - Legal Causation
    - Society determined
      - myocardial infarction in firefighter/police officer
      - Virginia CTS an ODL and almost never covered
Determination of Work-relatedness

- Medical Causation
  - Scientific determination of Cause and Effect
  - Principles of Evidence Based Medicine
- Administrative Law Judges causation decisions
  - Legal causation
  - presumably takes into account medical causation
Before you diagnose yourself with depression or low self-esteem, first make sure you are not, in fact, just surrounded by assholes.
Medical Causation Levels of Certainty

- MPTN: More probable than not
- RDOMC: Reasonable degree of medical certainty
- RDOMP: Reasonable degree of medical probability
- 51% to 49% certainty
- Probability versus possibility
- Language may be state specific
- Wisconsin allows any of the above terminology
Medical Causation level of certainty

- legal definitions of medical findings
- not commonly utilized in clinical decision making
  - clinical decision making generally requires 95% confidence
Practitioner-Client Relationship

Evaluate problem outcome

Collect and assess data

Identify interim/dismissal problem rating

Individual, Family, or Community

State problem

Plan and intervene

Identify admission problem rating
Epidemiological Study Design

✦ Observational in nature (versus experimental)

✦ Prospective versus retrospective

✦ Randomized selection of study groups

✦ Double blinding
Figure 1. Evidence pyramid graphic, from SUNY downstate medical research library of Brooklyn, EBM tutorial
Study Design Hierarchy

Ranks the relative value of various types of study designs from highest to lowest

- Prospective Cohort
- Retrospective Cohort
- Cast-Control
- Cross-Sectional
- Ecological
- Proportionate Mortality Ratio
- Consecutive Case Series
- Case Reports
- One Case Report
Prospective Cohort

- Cohorts are groups of similar individuals. Usually at least two groups (study and control) are chosen *prior to* event/exposure/disease development.

- Individuals differ with respect to certain factors under study.

- Goal is to determine how these differing factors affect rates of a certain outcome.

  - For example, one might follow a cohort of middle-aged truck drivers who vary in terms of smoking habits, to test the hypothesis that the 20-year incidence rate of lung cancer will be highest among heavy smokers, followed by moderate smokers, and then nonsmokers.

  - The prospective study is important for research on the etiology of diseases and disorders in humans because for ethical reasons people cannot be deliberately exposed to suspected risk factors in controlled experiments.
Retrospective Cohort

- looks back at events/exposures/disease development that have already taken place
- groups of individuals who are alike in many ways but differ by a certain characteristic (for example, female nurses who smoke and those who do not smoke) are compared for a particular outcome (such as lung_cancer).
Case Control

• Case-control studies are used to identify factors that may contribute to a medical condition by comparing subjects who have that condition/disease (the 'cases') with patients who do not have the condition/disease but are otherwise similar (the 'controls').

• The great triumph of the case-control study was the demonstration of the link between tobacco_smoking and lung_cancer. A statistically significant association between the two in a large case-control study. Opponents argued for many years that this type of study cannot prove causation, but the eventual results of cohort_studies confirmed the causal link which the case-control studies suggested, and it is now accepted that tobacco_smoking is a cause of about 87% of all lung cancer mortality in the US.
Cross Sectional

- involve observation of all of a population, or a representative subset, at one specific point in time

- may be used to describe some feature of the population, such as prevalence of an illness, or they may support inferences of cause and effect

- use of routinely collected data allows large cross-sectional studies to be made at little or no expense. This is a major advantage over other forms of epidemiological study

- For example, in a cross-sectional survey, a specific group is looked at to see if an activity, say alcohol consumption, is related to the health effect being investigated, say cirrhosis of the liver. If alcohol use is correlated with cirrhosis of the liver, this would support the hypothesis that alcohol use may cause cirrhosis.
Causal Association Determination

Musculoskeletal Disorders (MSDs)

- Causation of MSDs has been controversial in large part owing to numerous weaknesses in the available, quantitatively large but qualitatively relatively sparse epidemiological literature

- These sparse data are in contrast with extensive, large-scale studies on other disorders such as neoplasms and cardiovascular disease

- The differences are in large part attributable to disproportionate funding of research into fatal outcomes

- In the case of MSDs, there are few prospective cohort studies, samples are small, exposures are not well measured in many studies, biases are not insignificant, and confounders are generally only partially controlled
"The tests are back and they show what caused those bruises on your stomach."
Epidemiological methodology to determine causation

- 6 main steps:
  - Collect all epidemiological literature on the disorder
  - Identify the design of each study
  - Assess the methods of each study
  - Ascertain statistical significance
  - Assess the studies using updated Hill Criteria
  - Derive conclusion about degree of causal association
Review literature

- The scientific basis for the determination that a condition is work-related.

- With MSDs, this is difficult:
  - poor and/or conflicting epidemiologic evidence
  - unclear attributable proportions of occupational and non-occupational factors.
Assess study methods

- Exposure assessment methods and potential biases
- Disease ascertainment methods and potential biases
- Absence of significant uncontrolled confounders, consideration of residual confounding
- Addressing of other potential biases
- Adequacy of biostatistical methods and analytic techniques
Updated Hill Criteria

- Temporality
- Strength of Association
- Dose-response relationship
- Consistency
- Coherence
- Specificity
- Plausibility
- Reversibility
- Prevention/elimination
- Experiment
- Analogy
- Predictive performance
Conclusion Certainty: work-relatedness

- High degree of certainty: if above steps are addressed with multiple, well-designed studies and all criteria are addressed, a causal association may be concluded.

- Low degree of certainty: if only some statistically positive studies, few cohort studies, some conflicting results, only few criteria consistently addressed, a causal association cannot be concluded.

- Purely speculative: if no sound epidemiological evidence.
Clinical determination work-relatedness

- (Developed by NIOSH and ACOEM)
- Identify evidence of disease.
- Review and assess the available epidemiologic evidence for a causal relationship.
- Obtain and assess the evidence of exposure.
- Consider other relevant factors
- Form conclusions about the work-relatedness of the disease in the person undergoing evaluation
“I’m stumped. We’ll have to wait for the autopsy.”
Evidence of disease

• Symptoms
  • (e.g. In CTS, paresthesias in median nerve distribution)

• Physical Examination findings
  • (signs: muscle wasting, decreased grip strength, Tinel’s sign, Phalen’s sign)

• Confirmatory testing
  • (electrodiagnostic studies)

• Exclusion of other potential diagnoses
  • (radiculopathy from cervical disc disease)

• If evidence does not support a particular disorder, work-relatedness of the disorder is unlikely
Evidence of Exposure

from best to worst reliability

- Quantified personal or individualized measurement
- Quantified surrogate of exposure
- Quantified pseudosurrogates
- Employment in a defined job category
- Employment in a defined job trade
- Employment in a plant or obtained from employer/employee
Other relevant factors

- Risk factors
- Covariates
- Prior injuries
- Psychological factors
- Other disease
- Efficacy of treatments
- How strongly are these factors associated with disorder?
other relevant factors

- Confounders?
- Judge the Validity of Testimony
- Any conflict regarding some important aspect?:
  - date of injury
  - mechanism of injury
  - prior injury status
- Are provider opinions evidence-based?
The last step involves reassessment of data obtained in the entire series of steps while taking into account the legal jurisdiction in which the action is occurring. The practitioner should know the injury definitions that determine whether the disorder is work-related. In Wisconsin:

• Direct Injury---work-related

• Precipitation, aggravation and/or acceleration of a pre-existing, progressively deteriorating condition beyond its usual and normal progression--work-related

• Appreciable period of workplace exposure being a material and substantial contributing factor to a conditions onset and development--work-related

• Mere symptom manifestation of a pre-existing condition according to its usual and normal progression: not work-related.
“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”
Scoring Guides

A comprehensive literature search is performed for each topic.

Each study is evaluated by a quality scoring scale (0-140).

Each study is evaluated for study design classification.

Each article quality score is multiplied by study design weight factor.

Final impact rating for all studies are summed for strength of evidence.
## Strength of Evidence

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Strong</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Strong</td>
<td>300-500</td>
</tr>
<tr>
<td>Some</td>
<td>100-299</td>
</tr>
<tr>
<td>Insufficient</td>
<td>&lt;100</td>
</tr>
</tbody>
</table>
upper limb msds

The following conditions are the most common upper limb conditions about which physicians are asked to opine regarding causation (*White Paper Available):

- Ganglions
- Dupuytren’s Contractures
- Basal Thumb Arthritis
- Trigger Digits
- De Quervain’s Disease
- Painful Elbow (medial/lateral epicondylitis)*
- Carpal Tunnel Syndrome
- Ulnar Nerve Entrapment
- Shoulder Disorders
Evidence Strength for Upper Extremity MSDS

- Occupational risk factors studied include:
  - force
  - repetition
  - posture
  - vibration
  - combination of factors
  - temperature
  - length of employment
  - hand dominance
  - keyboard activities
non-occupational risk factors

- Age
- BMI
- Sex
- Diabetes
- Biopsychosocial factors
- Genetics.
Evidence for work-relatedness of UE MSDs

- With few exceptions, evidence for work-relatedness re occupational risk factors ranges from *insufficient* to *some* evidence for upper extremity MSDs commonly claimed as work-related.

- Exceptions:
  - Very strong evidence for a combination of risk factors (e.g. Force and repetition, force and posture):
    - Painful elbow (lateral and medial epicondylitis)
  - CTS (national and international epidemiologic surveillance data consistently demonstrated that highest rates of CTS occur in occupations with high physical demands that include intensive manual exertion, such as meatpacking, poultry processing, and automobile assembly work.
  - Strong Evidence for Vibration for Dupuytrens Disease.
Case Example: Carpal Tunnel Syndrome
case example: carpal tunnel

* 50 year old female secretary files workers compensation claim for bilateral carpal tunnel syndrome

* She has been employed at a large insurance company for 15 years

* About 2 years ago she began to experience nocturnal paresthesias which began to interfere with her sleep

* She went to the local drug store and bought some wrist braces to wear at night, which temporarily resolved her symptoms.
About 3 months ago her symptoms re-emerged

she began to get symptoms during the daytime

She recalled her mother had CTS

at her yearly check up she told her physician about her symptoms

She was referred for EMG/NCV testing, which was consistent with bilateral CTS

Surgical correction was recommended but deferred pending insurance considerations
The claimant believes that her CTS is caused by her work activity as a secretary.

As a secretary, the claimant’s work exposure involved extensive keyboard/mouse/computer usage.

It is “common knowledge” that extensive keyboarding may be hazardous to one’s health, leading to her belief that her condition is undoubtably caused by or at the very least significantly contributed to by her years of data entry/computer usage.

Her physician supported her belief and opined that her CTS is work-related due to her repetitive work activity. The claimant was sent for Independent Medical Examination.
Case example cts

- IME review of the claimant’s medical history revealed the presence of diabetes, hypertension, and hypothyroidism, all diagnosed within the past 5 years.

- She also has a history of lifelong obesity.

- On physical examination, the claimant’s height was 5 feet, 2 inches and her weight 180 pounds. Her examination was otherwise unremarkable.

- The examiner concluded that her CTS was not work-related, citing the current clinical literature in disputing occupational causation.
Other mdss

- Functional Somatic Syndrome
- Myofascial Pain Syndrome
- Fibromyalgia
- Dystonia
- Chronic Fatigue Syndrome
- Acute and Chronic Pain
work-related other MSDS

- Determination of work-relatedness for causation of MSDs should be based on sound science.
- Currently, there is little evidence that occupational exposure is the primary contribution to the development of these other MSDs.
- Lack of evidence is confounded by difficulty assigned a specific medical diagnosis to a condition that is primarily determined by subjective symptoms and has led to conflicting conclusions by many authors.
George Carlin, 1937 - 2008

“Isn’t it a bit unnerving that doctors call what they do “practice”?”