CTS

Overworking the #1 tool in a farmer's toolbox.

An overview of Carpal Tunnel Syndrome (CTS) of the hand and wrist.

Repetition, **Repetition**



Session Objectives

- Participants will identify the common symptoms and causes of CTS
- Participants will be provided with examples of agricultural tasks that are associated with CTS
- Participants will gain knowledge regarding treatment methods of CTS
- Participants will explore assistive technologies and tools to help with CTS pain
- **Supplemental Materials-** Hand/Wrist Model, Educational Poster, Wrist Braces, Exercises/Tests

CTS Overview

Overview of Carpal Tunnel Syndrome

The median nerve, along with ligaments and tendons, pass through a narrow space in your wrist called the carpal tunnel.



FOR MOLIY BORAWARABARIN

CTS Overview

Overview of Carpal Tunnel Syndrome (CTS)

- Once the nerve is irritated in this narrow space, a person will begin to experience pain symptoms and eventually a reduction in strength of the hand.
- Very closely associated as a form of arthritis, but it does not directly affect the carpal joint.

Median nerve is compressed at the wrist, resulting in numbness or pain



Possible Causes

• The jury is still out on the exact cause of CTS because it varies from one person to the next.

• Some possible causes include:

- congenital (small tunnel space)
- swelling in the wrist area following an injury
- fluid retention (especially during pregnancy)
- repetitive wrist motion (i.e., driving, throttle-usage, carpentry or plumbing work, using hand tools, etc.)
- maintaining an uncomfortable angle of the wrist for long periods of time (typing)

Statistics

CTS Epidemiology and Clinical Findings

Estimated 1 in 10 Americans (3%)
Female to Male ratio = 4:1
Most often 30-60 years old

Progression

- Onset is usually slow and non-worrisome, but can have severe effects.
- Symptoms can come and go.
 - 1/3 say that their symptoms disappear on their own, but then reappear later on
 - Bilateral (both wrists) usually indicated more ongoing pain and limitations, dominant hand

AKA "Handcuff Neuropathy", "Keyboarder's Disease" and "Nocturnal Paralysis"

Limitations

CTS Signs/Symptoms

- Hand weakness are common; may include stiffness, clumsiness, and difficulty with gripping/holding things
- Pain, numbness, burning, loss of sensation in the wrist area and palm of the hand (may radiate to the forearm, elbow, and shoulder)
 - To relieve the symptoms, patients often "flick" their wrist as if shaking down a thermometer
 - Nocturnal symptoms that wake the individual are more specific of CTS, especially if the patient relieves symptoms by shaking the hand/wrist

Atrophy

Limitations

If pressure continuesthe muscles can weaken and atrophy



Examinations

Diagnosis

Clinical Examination Options:

• Tinel's nerve percussion test

o Phalen's wrist flexion test

- Tourniquet test
- Carpal compression test
- Tethered median nerve stress test
- Nerve conduction study (electromyography)
- Weak thumb abduction test

Tinel's Sign

Tinel's Sign

- Gently tapping along the median nerve at the wrist
- Abnormal = tingling in median nerve dist.
- Generally 60%-73% of patients with CTS have a Tinel's sign present
- Tinel's sign is PRESENT if tingling, numbness or pain in median nerve distribution are produced by this action.
 - The sign is ABSENT if not.



Phalen's Test

Phalen's Test

- Performed by maximally flexing the wrist
- Between 30 seconds to 1 minute of this will worsen or reproduce pain or tingling in 80% of cases of CTS.
- It is POSITIVE if symptoms are worsened or reproduced.
 - It is NEGATIVE, of course, if they are not.





Incorrect Diagnosis

Differential Diagnostics

- Rheumatoid Arthritis
- Tendonitis
- Tenosynovitis
- Reflex Sympathetic Dystrophy
- Diabetic neuropathy

Agricultural Tasks

















Livestock Tasks



















Options

CTS Treatment

- Most cases of CTS can be adequately treated with conservative (i.e. non-surgical) management
 - Rest, therapy, exercises
 - Neutral-position splints
 - NSAIDs
 - Steroid injections (short-term relief)
 - Ergonomics
 - Ultrasound therapy

Surgical management is generally reserved for severe sensory loss or atrophy, and is considered after the non-invasive options have failed to provide relief.

Predicting the Outcome of Conservative Treatment for Carpal Tunnel Syndrome

Score 1 point for each "yes" answer and zero for each "no" answer. See the scoring key for the predicted successful outcome of conservative treatment.*

 Have symptoms been present for more than 10 months? 	Yes	No
2. Does the patient have constant paresthesias?	Yes	No
3. Does the patient have flexor tenosynovitis ("triggering" of the digits)?	Yes	No
4. Is Phalen's maneuver positive within less than 30 seconds?	Yes	No
5. Is the patient older than 50 years?	Yes	No
SCORING KEY: zero points = 65% success rate; 1 point = 41.4% success rate;		

2 points = 16.7% success rate; 3 points = 6.8% success rate; 4 or 5 points = 0% success rate; 4 or 5 points = 0% success rate.

*—Outcome rates are based on the use of wrist splinting and nonsteroidal anti-inflammatory drugs; success rates may be higher with oral corticosteroid therapy or local corticosteroid injection.

Wear Them!

Wrist Splints or Braces

- Reduce inflammation and irritation of the median nerve, best when worn constantly and when started within 3 months of onset
- Durability
 - Soft- working environments/flexibility
 - Hard- nighttime, increased pain
- Two categories
 - Custom splints (made by a PT or OT)
 - OTC splints (pre-sized)

WRIST SPLINTS

Medication

ORAL MEDICATIONS

- Diuretics
- Nonsteroidal antiinflammatory drugs (NSAIDs)
- Topical analgesics (creams)
- Pyridoxine (vitamin B6)
- Orally administered corticosteroids





Injections

LOCAL INJECTION

- A mixture of lidocaine and prednisolone is injected with a 25-gauge needle at the distal wrist crease
- Splinting is generally recommended after local corticosteroid injection
- If the first injection is successful, a repeat injection can be considered after a few months
- Surgery should be considered if a patient needs more than two injections



Figure 4. Corticosteroid injection of the carpal tunnel provides short-term relief for many patients and may eliminate the need for surgery in those with acute symptoms and no significant muscle atrophy. A 25- or 27-gauge needle is inserted just proximal to the wrist crease, on the radial side of the palmaris longus tendon, and angled toward the fingers as shown. Symptoms return within six months after injection in 50% of patients.

Ergonomics

GENERAL MEASURES

- Avoid repetitive wrist and hand motions that may exacerbate symptoms or make symptom relief difficult to achieve
- Do not use vibrating hand tools or use excessive grip when driving vibrating machinery
- Ergonomic measures to relieve symptoms depending on the motion that needs to be minimized
- Use ergonomic assistive devices



Surgical Treatment of CTS

- Surgery for CTS involves either open or endoscopic surgery with the same goal: surgical division of the Transverse Carpal Ligament.
- Approximately 90% of surgically-treated patients report satisfactory results, with either improvement or resolution of symptoms of CTS.
 - Complication rate ~ 2%

Incision

Median nerve

Transverse carpal ligament released



Complications

Possible Surgical Complications

- 1-Infection
- 2- Nerve injury
- 3- Painful scar
- 4- Bowstringing
- 5- Muscle weakness
- 6- Skin necrosis



Assistive Technology and Adaptive Tools

- Alternative Keyboards and Computer Pointers (Mouse)
- Leverage
 equipment
- "Good Grips"
- Ring Knives
- Sheet/Panel Grips
- Calf Bottle Holders

- Easy Gate Latches
- Jar Openers
- Door Knob Grips
- Card/Paper Holder
- Rolling Cart
- Button Hooks
- Velcro Strips
- Wrist Phone Holders
- "C" gates

The "Helpful Hand" Brace



The "Lend-A-Hand" Forearm Assistive Device



The "Bionic Gloves"



The "Tube Grip"



The "Easy-Grip Hand Tool"



Summary

Conclusion Overview

- Carpal Tunnel Syndrome is a common, debilitating condition for which there is an excellent prognosis, provided that the condition is recognized and the patients receive appropriate attention and treatment.
- Pain and numbness in the wrist/forearm are the classic symptoms.
- Home and work activities can be severely limited by CTS, debilitating the individual in many ways.
- There is a simple progression of non-invasive treatments that can be applied before the option of surgery is considered.

References

Sources

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- Arthritis Foundation
- Carpal Tunnel Assocation
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- National Institute of Neurological Disorders and Stroke: Carpal Tunnel Syndrome Fact Sheet