Intro To Rehabilitation, What Is It And Do I Want To Add It To My Practice?
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What is Veterinary Rehabilitation?
• Definition:
  • The treatment of physical injury or illness in an animal to decrease pain and restore function

What is Veterinary Rehabilitation?
• It is NOT all about just the Underwater Treadmill...
  • It is about finding the injury, eliminating pain, healing the injury, and strengthening the muscles to prevent further injury
What is Veterinary Rehabilitation?

• Optimizing Quality of Life (rather then just improving Quality of Life)
  – Geriatrics or weakness
    • Improving strength to increase activity, increasing strength of muscles, tendons, and ligaments, increases stability, decreases pain so they are more active which increases strength

What is Veterinary Rehabilitation?

• Optimizing Quality of Life (rather then just improving Quality of Life)
  – Neurological patients
    • Stimulate nervous system to improve balance and proprioception
    • Improve daily functions
      – Ability to use stairs, dog door, get on couch…

What is Veterinary Rehabilitation?

• Optimizing Quality of Life (rather then just improving Quality of Life)
  – Post Surgical patients
    • Eliminate pain
    • Eliminate swelling
    • Normal Range of Motion
    • Improve daily functions
      – Ability to use stairs, dog door, get on couch…
A ‘New’ Diagnostic Algorithm

- Emphasis upon soft tissues as well as joints
- Special tests allowing determination of specific tendinopathies, soft tissue abnormalities, etc.

Subjective Outcome Measures

- History
  - Previous or concurrent conditions
  - Functional Daily Living Scale
  - Progression
  - Nutrition
  - Continence
  - X-rays and lab work

Objective Outcome Measures
Assessment

- **Stance**
  - Stand – Square
  - Sit – Square
  - Sternal - Sphinx
- **Transitions**
  - Stand to sit
  - Sit to down
  - Down to sit
  - Sit to stand

- **Gait**
  - Walk toward and away
  - Walk perpendicular
  - Circles
  - Pivots

Assessment

- **Soft tissue exam**
  - Know anatomy
  - Palpate for:
    - Tightness
    - Trigger points
    - Spasms
    - Atrophy

Assessment

- **Joint exam**
  - Know anatomy
    - Toes
    - Carpal
    - Elbow
    - Shoulder
    - Spine
  - Toes
  - Tarsus
  - Stifle
  - Hip
Assessment

- Neurological exam
  - Reflexes
  - Postural Reflexes

Rehabilitation Approach

- Look at all of the issues and create the puzzle
- Look at all the options to treat
- Treat and reassess
- Treat and reassess
- Strengthen

Goals of Rehabilitation

- #1 Always - Eliminate Pain
- Normal neurological function
- Heal soft tissue injuries (Sprain vs Strain)
- Normal Range of Motion (ROM)
- Eliminate swelling
- Normal weight bearing and Posture
- Eliminate lameness/Normal Gait
**Rehabilitation Approach**

- **Manual Therapy and Exercises**
  - Joint Mobilizations
    - Arthrokinematics
    - Osteokinematics
  - Therapeutic exercise
    - Concentric contractions
    - Eccentric contractions

**Therapeutic Exercise Equipment List**

- PHYSIOBALLS
- THERABANDS
- ROCKER BOARDS
- CAVALETTI POLES

**Rehabilitation Approach**

- Modalities
  - LASER
LASER: Mechanism of Action

- Increases cell ATP production
- Vasodilation
- Angiogenesis
- Decreases inflammation
  - IL-1, IL-6, COX-2, TNF-α
- Decreases edema
- Slows nerve conduction
- Inhibits peripheral nociceptors


- 2 and 4 J/cm²
- Treated daily or EOD
- Decreased inflammation, increased collagen in 4 J/cm² EOD
- Increased strength when treated EOD

The Effect of Low-Level Laser Therapy (LLLT) with Helium-Neon Laser on Operative Wound Healing in a Rat Model


- 6 J/point 2x week for 4 weeks
- Significant increase in circulation
- Significant improvement in pain, flexion ROM
Meta-Analyses

• Laser for tissue healing: “phototherapy is highly effective for tissue repair”
  – strong support from experimental animal studies
    Fulop AM Photomed Laser Surg, 2006
• Laser for pain relief: “phototherapy relieves pain of various etiologies”
  Fulop AM Clin J Pain, 2010

Rehabilitation Approach

• Underwater treadmill

Electrotherapy

• NMES= Neuromuscular electrical stimulation
  — muscular contraction
• TENS= Transcutaneous electrical neuromuscular stimulation
  — pain relief
• Others – Interferential, Alpha Stim., Russian Stimulation
Rehabilitation Approach

• Neuromuscular Stimulation (NMES)
  – Strengthening with secondary pain relief

Canine Studies

• NMES: CCL transection model
  – decreased cartilage damage,
  radiographic OA, crepitus,
  lameness
  – increased thigh circumference

  Johnson JM. Vet Res 1997

Rehabilitation Approach

• Therapeutic Ultrasound
Ultrasound: MOA

- Tissue heating results in: increased collagen extensibility, decreased muscle spasm, increased blood flow, mild inflammation
- Enhanced tissue repair: stimulates fibroblasts, increases protein synthesis, increases blood flow, facilitates inflammation, increases GAG synthesis, improves cartilage healing

DeDeyne PG 1995; Levine D 2001; Prentice WE 2008; Cook SD 2008

Conservative treatment of partial gastrocnemius muscle avulsions in dogs using therapeutic ultrasound: A force plate study

- Case report (N=2)
- Diagnostic US and force plate
- Injury healed; follow up 6-12 months

Rehabilitation Approach

- Pulsed Electromagnetic field therapy devices (PEMF)

Day 1 Lecture 1
Rehabilitation Approach

- Land treadmill

Rehabilitation Approach

- Shock Wave

Extracorporeal Shock Wave Therapy: MOA

- Modulates inflammation:
  - down-regulates inflammatory cytokines

- Increase bone and tissue healing:
  - increases angiogenic and osteogenic growth factors: BMP2, TGF-β, VEGF, PCNA, eNOS

Rompe JD 1996; Sems A 2006
Fracture Healing

Delayed and non-union fractures
- Treatment with ESWT: 76% union without further surgery
  Schaden W, Clin Orthop Rel Research, 2007
  • Success with surgery= 79%
- Preemptive: Significant (p<0.001) decrease in rate of non-unions
  • Wang CJ, Trauma Surgery, 2006

Shock Wave - Research

- 15 dogs with elbow OA
- Force plate analysis
- 500 total pulses - 5mm focused probe - VersaTron 4 Paws Pulse Vet technologies unit
- Divided into 4 locations per elbow
- Treated Day 0 & 14

Shock Wave

- Evaluated day 0, 14, 28
- Increased in peak vertical force by 4.5%
- No Significant Change in ROM
- No Significant Change in subjective gait analysis
- Increase in weight bearing by 10%
- Better then NSAIDs
Effect of Shock Wave Therapy on Acute Fractures of the Tibia

A Study in a Dog Model

Cheng-Jen Wang, MD⁎; Hoon-Yong Hwang, MD⁎;
Hsin-Hsiung Chan, MD⁎; Chun-Hsiung Yu, MD⁎;
and Koender/ E. Yee⁵

• Acute fracture healing model
• ESWT at the time of fracture creation
• No difference in callus at 8 weeks
• Significantly greater callus at 12 weeks
• Significantly more cortical bone at 12 weeks

The Effect of Shock Wave Therapy on Patellar Ligament Desmitis after Tibial Plateau Leveling Osteotomy

Alison Gallaghern, DVM; Alan R. Cross, DVM; Diplomate ACVR; and Gustavo Sepulveda, DVM; Diplomate ACVR

• n= 30 large breed dogs
• Treatment vs. control group
• Treated at 4, 6 weeks post TPLO
• Significant decrease in patellar ligament thickening at 6, 8 weeks in ESWT group

Rehabilitation Approach

• Cryo Therapy/ Heat Therapy
Cryotherapy: Mechanism Of Action

Decrease inflammation:
vasoconstriction, decrease histamine release, edema, proteases

Decrease pain:
decrease prostaglandins, muscle spasm, nerve conduction velocity


• Extracapsular technique; N= 24
• Randomized, controlled: bandage (control), bandage + cold compression, cold compression alone, micro-current
• Cold compression with or without bandage decreased swelling more than bandage alone

Effect of cold compression, bandaging, and Microcurrent Electrical Therapy after Cranial Cruciate Ligament Repair in Dogs

• TPLO; N = 34
• Randomized, controlled: cold compression therapy, no CCT
• Significantly decreased pain, lameness, swelling, and improved ROM in treatment group 24 h post op
Rehabilitation Approach

• Orthotics and Prosthetics

Gastrocnemius Tendon Strain in a Dog Treated with Autologous Mesenchymal Stem Cells and a Custom Orthosis

Vet Surg 2013

J. Brad Case1, DVM, MS, Ross Palmer1, DVM, MS, Diplomate ACVS; Alex Valdez-Martinez1, DVM, Diplomate ACVR; Erick L. Egger1, DVM, Diplomate ACVS; and Kevin K. Haussler1, DVM, DC, PhD, Diplomate ACVSMR

Case Report:

• Bone-marrow derived, autologous mesenchymal stem cells transplanted into core lesion
• Custom, progressive, dynamic orthosis applied
• Objective motion control

What is the Future of Veterinary Rehabilitation?

• How did we get here?
Background

Human Physiotherapy
• Began with World War I

Equine Rehabilitation
• Began in the 1960’s

U.S. Certification courses began 1990’s

Current Issues In Rehabilitation

Veterinary Colleges
– 17 in U.S. currently offering rehabilitation in clinics
– Student Elective:
– CSU and Texas A&M have 3rd-Year Student Electives
– Residency at Colorado State University

“I believe that in the near future, failing to refer a patient for physical therapy will amount to malpractice.”
“I believe that in the near future, failing to refer a patient for physical therapy will amount to malpractice.” ~1959
H. A. Apfelbach, MD
Director of Orthopedics
Rush Presbyterian Medical Center
Chicago, IL

Animal Rehabilitation

• WHAT IS DRIVING THIS NEW FIELD?

Public Awareness

• Similar to Acupuncture in the 1980’s
  – Client driven demand for veterinary services
• Current Drivers for Canine Rehabilitation
  – Agility 2014
    • Over 1 million entries
    • >1000 Sanctioned Events in the US
Government Awareness

Why Should You Add Rehabilitation To Your Practice?

- Increased awareness
- Client demand
  - Pain management
  - Return to sports
  - Improved geriatric therapy
  - Weight management

What Would It Take To Add Rehabilitation To Your Practice?

- Training your team
- Minimal equipment list
- Minimal space dedication
IS VETERINARY REHABILITATION A VIABLE BUSINESS?

- Done correctly, YES!
- Business models that have worked the best:
  - Referral centers with surgery
  - Free standing rehabilitation-only, referral-only facilities
  - Specialty centers with emphasis on Complementary Medicine and Pain Management
  - General Practices that recognize the client-driven demand for Rehabilitation

◆Best Clients in the World
◆Love their “Fur kids” and pay their bills

In Conclusion

- Your clients are looking for rehabilitation therapy for their athletes and pets
- They are willing to drive past your practice to one that is offering Rehabilitation
- Learning anatomy and exam techniques will benefit ALL of your patients
Questions???