# ULTRASUONI

- Mediante US si possono scaldare tessuti in profondità da 2 a 5 cm
- L'energia del fascio ↓ quando attraversa i tessuti
- L'assorbimento è ↑ proteine ↓ adipe


Alto assorbimento tessuto osseo con rischio di dolore e danni al periostio

# Meccanismo d'azione

- **Effetti meccanici**: l'azione meccanica è dovuta al movimento delle particelle dei tessuti attraversati dall'onda ultrasonica. Le variazioni di pressione che si producono sono in grado di determinare un movimento dei liquidi (**microcorrenti**) e un **aumento della permeabilità** di membrana e la scompaginazione dei tessuti per **separazione delle fibre collagene.**

**Effetti termici:** l'effetto termico dipende essenzialmente da due fattori:

1. Le **caratteristiche di assorbimento** del mezzo biologico
2. **La riflessione** dell'energia a livello dell'interfaccia tra tessuti a differente impedenza acustica. Il passaggio di ultrasuoni attraverso i tessuti "molli" crea un innalzamento della temperatura per assorbimento ( esempio frizioni)

**Effetti chimici:** l'azione chimica con modificazione del ph locale e della permeabilità delle membrane cellulari e con cambiamenti molecolari **è provocata dalle notevoli forze di accelerazione** alle quali le particelle dei tessuti sono sottoposte al passaggio dell'onda ultrasonica.

**Effetti di cavitazione**: la cavitazione è la capacità degli ultrasuoni di generare in un fluido piccole bolle del gas disciolto con successivo aumento di dimensione e possibile esplosione delle bolle.

Da un punto di vista istologico il risultato è una distruzione cellulare irregolare con emorragia di tipo petecchiale. A dosaggi terapeutici le reazioni distruttive come l'emolisi si verificherebbero solo in presenza di bassa concentrazione cellulare e bassa viscosità del mezzo, come a livello dell'occhio e dell'utero.

# APPLICAZIONE

- TESTINA O MANIPOLO MOBILE
- IMMERSIONE IN ACQUA
- CUSCINETTI

TUTTO PREVIA TRICOTOMIA E PULIZIA

# PRECAUZIONI E CONTROINDICAZIONI

- PERICOLO USTIONI (INTENSITA' ECCESSIVA O ESPOSIZIONE FISSA) **2cm/sec.**
- **Evirare US:**

Cuore, occhi, utero gravido, gangli cervicali, seni carotidei, testicoli, neoplasie, aree lesionate, midollo spinale soprattutto dopo emilaminectomia, encefalo, ferite contaminate, aree anestetizzate o denervate e fisi di accrescimento di cuccioli

PRESENZA DI PROTESI O PLACCHE METALLICHE

FASE ACUTA

# CONDIZIONI CLINICHE

- TENDINITI CRONICHE
- BURSITI
- CONTATTURE E ADERENZE CICATRIZIALI
- CONDIZIONI DI RIDOTTO ROM
- DOLORE E SPASMO MUSCOLARE
- PRIMA DI PROM E STRETCHING
- EFFETTI NON TERMALI

Schede riabilitative

## NEW CLIENT INFORMATION

| | |
|---|---|
| Owner's name | |
| Address | |
| Home phone | |
| Work phone | |
| Veterinarian/surgeon | |
| Date of surgery/injury | |

**PATIENT INFORMATION:**

| | |
|---|---|
| Name | |
| Breed | |
| Age | |
| Sex | |
| Color | |
| Spayed/neutered | |

**PATIENT HISTORY:**

| | |
|---|---|
| Rabies vaccination | |
| Past medical history | |
| Previous surgery | |
| Allergies | |
| Special diet/medication | |
| Previous activity level | |
| History of present illness | |
| Treatment since injury/surgery | |
| Owner's goals | |

**CANINE REHABILITATION CLINIC**

**Referral Form**

Client_____ Patient_____ Date_____

Breed_____ Sex_____ Age_____ Weight_____

Referring veterinarian/clinic:_____

Clinical condition:_____ Onset/Sx date:_____

Special instructions/precautions_____

Frequency and duration: _____Times per day for _____days

☐Board until _____ Drop off: ☐ MWF ☐ Other_____

☐ T/Th

Plan: ☐ Evaluate and treat

☐ Hot pack
☐ Cryotherapy
☐ Ultrasound
☐ Electrical stimulation
☐ Therapeutic exercise
☐ Hydrotherapy
☐ OTHER:_____

☐ Gait training
☐ Massage
☐ Joint mobilizations
☐ Weight-bearing/weight shifts
☐ Passive range of motion
☐ Neuromuscular reeducation

DVM Signature_____

## PHYSICAL THERAPY INITIAL EVALUATION

| | |
|---|---|
| Patient's name: | |
| Date: | |

**PHYSICAL EXAMINATION:**

| | | | |
|---|---|---|---|
| Skin/incisions: | | Color/temp: | |
| Heart rate: | | Respirations: | |

**POSTURE/GAIT:**

| | | | | |
|---|---|---|---|---|
| General observation: | | | | |
| Preop/injury lameness: | Walk: | | Trot: | |
| Postop/injury lameness: | Walk: | | Trot: | |
| Standing limb position: | | Sitting limb position: | | |

| Circumference (cm): | 70% femur | 80% humerus | Joint line | Other |
|---|---|---|---|---|
| Affected: | | | | |
| Unaffected: | | | | |
| Other: | | | | |

**RANGE OF MOTION:**

| Joint(s): Aff/Unaff | Flexion | Extension | AB/adduction | Varus/Valgus | Other |
|---|---|---|---|---|---|
| Hip: | | | | | |
| Stifle: | | | | | |
| Hock: | | | | | |
| Shoulder: | | | | | |
| Elbow: | | | | | |
| Carpus: | | | | | |
| Other: | | | | | |

**PALPATION:**

| | |
|---|---|
| Forelimb | |
| Hind limb | |
| Spine | |
| Other | |

**SPECIAL TESTS:**

| | |
|---|---|
| Neurologic: | |
| Orthopedic: | |
| Functional: | |
| Other: | |

**Figure 3-4** Physical rehabilitation evaluation form.

*Continu*

**TREATMENT:**

| Modalities: | Manual: | Therex: |
|---|---|---|
| Interferential current | Massage | Gait training |
| Neuro-muscular electrical stimulation | Joint mobilization | Aquatic |
| | Passive range of motion | Functional |
| Other stim | | Swiss ball |
| Ultrasound | Other: | Foam roll |
| Ice | | Owner education |
| Heat | | Protocol review |
| Other | | Other: |

ASSESSMENT/GOALS:

| | |
|---|---|
| Decrease pain | |
| Decrease edema | |
| Increase weight-bearing | |
| Independent home exercise program | |
| Return to previous function | |
| Other | |

**PLAN:**

| | |
|---|---|
| Return visit | |
| Call for follow-up | |
| Call DVM | |
| Other | |

**DVM Signature** _____

Figure 3-4, cont'd

**CANINE ORTHOPEDIC REHABILITATION**
**EVALUATION FORM**

Patient_____ Client_____ Date_____

Breed_____ Age_____ Sex_____ Date of Sx/onset_____

Referring vet/clinic:_____ Diagnosis_____

History:_____

Medications:_____

Client's goals_____

Functional mobility_____

***OBJECTIVE***

Involved limb: RF LF RR LR

***Range of motion:***

| **Forelimb** | **R** | **L** |
|---|---|---|
| Shoulder | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |
| Elbow | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |
| Carpus | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |

| **Rear limb** | **R** | **L** |
|---|---|---|
| Hip | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |
| Stifle | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |
| Hock | | |
| 1. Flexion | _____/ | _____ |
| 2. Extension | _____/ | _____ |
| Other | _____/ | _____ |

***Visual inspection/palpation:***_____

***Pain score:***
0 = No pain on palpation of joint
1 = Mild pain; palpation completed
2 = Moderate pain; palpation completed with obvious discomfort noted
3 = Severe pain; palpation not completed
4 = Pain too severe; restraint/sedation needed to palpate

***Limb circumference:***

| *Muscle mass:* | Affected | Unaffected |
|---|---|---|
| Femur length | _____cm | _____cm |
| 70% of length | _____cm | _____cm |
| Girth | _____cm | _____cm |

*Joint effusion:*

| | Affected | Unaffected |
|---|---|---|
| Patellar tendon | _____ cm | _____cm |
| 2" above | _____ cm | _____cm |
| 2" below | _____ cm | _____cm |

**Figure 3-5** Orthopedic evaluation form.

***Gait analysis:***

Orthopedic lameness

| Degree of lameness (stance) | Degree of lameness (walk) | Degree of lameness (trot) |
|---|---|---|
| 0 = Normal stance | 0 = No lameness/weight-bearing on all strides observed | 0 = No lameness/weight-bearing on all strides observed |
| 1 = Slightly abnormal stance (partial weight-bearing) | 1 = Mild subtle lameness with partial weight-bearing | 1 = Mild subtle lameness with partial weight-bearing |
| 2 = Moderately abnormal stance (toe-touch weight-bearing) | 2 = Obvious lameness with partial weight-bearing | 2 = Obvious lameness with partial weight-bearing |
| 3 = Severely abnormal stance (holds limb off the floor) | 3 = Obvious lameness with intermittent weight-bearing | 3 = Obvious lameness with intermittent weight-bearing |
| 4 = Unable to stand | 4 = Full non-weight-bearing lame | 4 = Full non-weight-bearing lame |

Post-operative limb use

| Degree of limb use (stance) | Degree of limb use (walk) | Degree of limb use (trot) |
|---|---|---|
| 0 = Normal stance | 0 = No lameness | 0 = No lameness |
| 1 = Slightly abnormal stance (partial weight-bearing) | 1 = Lame but weight-bearing on >95% of strides | 1 = Lame but weight-bearing on >95% of strides |
| 2 = Moderately abnormal stance (toe-touch weight-bearing) | 2 = Lame but weight-bearing on >50% and <95% of strides | 2 = Lame but weight-bearing on >50% and <95% of strides |
| 3 = Severely abnormal stance (holds limb off the floor) | 3 = Lame but weight-bearing on >5% and <50% of strides | 3 = Lame but weight-bearing on >5% and <50% of strides |
| 4 = Unable to stand | 4 = Non-weight-bearing lame or weight-bearing on <5% of strides | 4 = Non-weight-bearing lame or weight-bearing on <5% of strides |

Gait deviations:_____

***ASSESSMENT***_____

***PLAN OF CARE***_____

Therapist Signature_____

**Figure 3-5, cont'd**

## CANINE NEUROLOGIC/SPINAL REHABILITATION EVALUATION FORM

Client_____ Patient_____ Date_____

Breed_____ Age_____ Sex_____ Date of Sx/Onset_____

Referring vet/clinic:_____ Diagnosis_____

History:_____

Prior surgeries:_____

Follow-up visit:_____ Medications:_____

Client's goals:_____

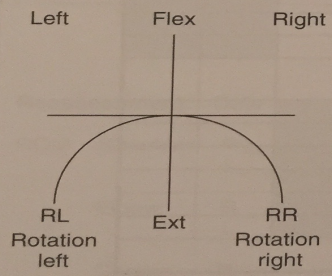
***OBJECTIVE***

Involved area(s) : RF LF RR LR Spine_____

***Mental status:*** Alert Depressed Stuporous Comatose Aggressive Fearful Disoriented

***Palpation/postures:***_____

***Active movements:***




*KEY:*
Affected Body Segment
X Tender
O Center of pain
≡ Spasm
/// Guarding
* Reflex contraction
∞ ROM

***Limb circumference:***

*Muscle mass:*

| | Affected | Unaffected |
|---|---|---|
| Femur length | _____cm | _____cm |
| 70% of length | _____cm | _____cm |
| Girth | _____cm | _____cm |

**Figure 3-6** Neurologic evaluation form.

**Gait analysis:**
Involved limb(s):_____

Degree of deficit (stance) _____

Degree of deficit (walk) _____

Degree of deficit (trot) _____

| |
|---|
| 5 = Normal strength and coordination |
| 4 = Can stand to support; **minimal paraparesis** and ataxia |
| 3 = Can stand to support but frequently stumbles and falls; **mild paraparesis** and ataxia |
| 2 = Unable to stand to support; when assisted, moves limbs readily but stumbles and falls frequently; **moderate paraparesis** and ataxia |
| 1 = Unable to stand to support; slight movement; when supported **severe paraparesis** |
| 0 = Absence of purposeful movement; **paraplegia** or **tetraplegia** |

Deviations:_____

*Proprioception:* (+ intact; – absent)

| RF | LF | RR | LR |
|---|---|---|---|
| | | | |

*Spinal reflexes:*
Key: 0 = Absent
+1 = Depressed
+2 = Normal
+3 = Exaggerated
+4 = Clonus
NE = Not examined

Crossed extensor: _____ Forelimb
_____ Hindlimb
+ Present
– Absent

| **Forelimb** | RF | LF | RR | LR |
|---|---|---|---|---|
| Flexor reflex | | | | |
| Biceps (C6-C8) | | | | |
| Triceps (C7-T2) | | | | |
| Ext carpi rad (C7-T1) | | | | |
| Deep pain | | | | |
| **Hindlimb** | | | | |
| Flexor reflex | | | | |
| Patella (L4-L6) | | | | |
| Cranial tibial (L6-L7) | | | | |
| Gastrocnemius (L7-S1) | | | | |
| Sciatic (L6-S1) | | | | |
| Perineal (S1-S3) | | | | |
| Deep pain | | | | |
| Cutaneous trunci | | | | |

***ASSESSMENT***_____

***PLAN OF CARE***_____

Therapist Signature_____

**CANINE ORTHOPEDIC REHABILITATION FLOWSHEET**

PATIENT NAME:_____ CLINICAL CONDITION:_____ SX DATE:_____

CLIENT NAME:_____

| TIME | Date | Date | Date | Date | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**Reassessment:** Date / /

ROM Shoulder R_____ L_____ Hip R_____ L_____

Elbow R_____ L_____ Stifle R_____ L_____

Carpus R_____ L_____ Hock R_____ L_____

Weight-bearing status:_____

Gait analysis:_____

*Proprioception:* RF LF RR LR

OTHER:_____

**PLAN:**_____

Limb circumference
Affected limb _____ Unaffected limb _____

Reflexes: R L
Forelimb flexor
Rear limb flexor
Patellar

Therapist Signature_____

**Figure 3-7** Daily flowsheet form.

# Caso clinico

# Caso clinico