

Four Leg News

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Volume 4 Issue 6

Introduction

This edition of Four Leg News contains information on a somewhat uncommon condition, Bell's Palsy. While it might be uncommon, it is something that human physiotherapists treat. So it was with that in mind that I thought it would make for good learning on FourLeg.com. In this issue you will learn about Bell's Palsy, the new thoughts on etiology, common (and uncommon) veterinary treatment, research on treatments in people, and typical physiotherapy treatments in people. You will be so much wiser by the end of reading this!! Stay tuned for the Video that brings it together with a plan for how to treat dogs with Bell's Palsy (Video Training 129)!

Cheers,
Laurie

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Bell's Palsy (Facial Nerve Paralysis)

DOGS

Garosi, LS, Lowrie ML, Swinbourne NF. Neurological manifestations of ear disease in dogs and cats. Vet Clin North Am Small Anim Pract 42(6), 2012: 143 – 1160.

The JOB of the facial nerve (CN VII)

- Motor innervation to the muscle of facial expression & caudal portion of the digastricus muscle
- Sensory innervation (providing sense of taste) to the rostral 2/3 of the tongue & palate
- Innervates the lacrimal gland, the glands of the nasal mucosa & the mandibular and sublingual salivary glands.
- A few fibres innervate the auricle of the ear

Relevant Neuro anatomy as it relates to the ear:

“The axons pass through the internal acoustic meatus of the petrosal bone on the dorsal surface of the vestibulocochlear nerve and travel within the facial canal that ultimately emerges at the stylomastoid foramen. As it travels through the temporal bone, the facial canal opens into the cavity of the middle ear lateral to the vestibular window, leaving the facial nerve briefly exposed to the middle ear cavity. After leaving the skull through the stylomastoid foramen caudal to the external acoustic meatus, the branches of the facial nerves are distributed to the muscles of facial expression (ear, eyelids, nose, cheeks, and lips) and to the caudal portion of the digastric muscle. The parasympathetic division of the facial nerve also has components located near the ear.”

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... Bell's Palsy (Facial Nerve Paralysis) continued

Signs of facial nerve paralysis:

- Ipsilateral drooping of ear and lip
- Widened palpebral fissure
- Drooling
- Absence of spontaneous and provoked blinking
- Absence of nostril abduction during inspiration
- Deviation of nostril toward normal side (unless chronic case in which nostril deviated to affected side and lips retracted farther than normal.
- Neurogenic keratoconjunctivitis and dry nose (involvement of parasympathetic supply of lacrimal and nasal glands respectively
- Facial spasms

Causes

- IDIOPATHIC (Most common – 75% of cases in dogs)
- Other:
 - Otitis media
 - Middle ear masses (neoplasia, polyps)
 - Head and/or peripheral nerve trauma
 - Intracranial neoplasia
 - Hypothyroidism
 - Potentiated sulfonamides (sensitivity)
 - Polyneuropathies
 - Iatrogenic – complications of total ear canal ablation lateral bull a osteotomy

Diagnosis of facial nerve palsy

- Observation of facial asymmetry (ears, eyelids, lips, & nose)
- Observation of impairments in spontaneous blinking or movement of the nostrils
- TESTS:
 - Palpebral reflex
 - Corneal reflex
 - Menace response
 - Pinching of the face
 - Use of Schirmer tear test strips



Background Info:

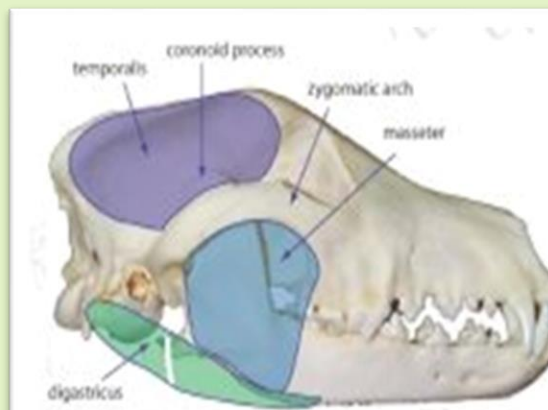
Palpebral reflex: The ability to close the eye lids when touched on the lids, eyelashes or globe itself.

Corneal reflex: An involuntary blinking of the eyelids elicited by stimulation of the cornea (such as by touching or by a foreign body), or bright light, though could result from any peripheral stimulus.

Menace response: A blink response to a threatening gesture towards the animal's eye (that does not create airflow and does not touch the animal).



Schirmer Tear Test Strips



Digrasticus

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Dewey CW, Cerda-Gonzalez S. Disorders of the peripheral nervous system: Mononeuropathies and polyneuropathies. In *A Practical Guide to Canine and Feline Neurology. 2nd Edition*. Dewey C ed. Wiley-Blackwell, Ames, Iowa, 2008, pp 427-467.

Bell Palsy is also known as idiopathic facial paralysis. It is defined as an acute mononeuropathy of one (usually) or both facial nerves. It has been reported in both dogs and cats.

Human literature points to an immune-mediated response triggered by herpes simplex viral infection.

Histopathologic evidence of axonal & myelin loss, without evidence of inflammation.

Affected animals tend to be middle aged or older, with an over-representation of cocker spaniels. Signs of the condition include drooping of the ear and lips, deviation of the nasal philtrum towards the normal side, decreased to absent palpebral reflex & menace response, and excessive salivation on the affected side. Some have troubles keeping food from dropping out of the limps on the affected side. Corneal ulceration may occur due to inadequate blinking ability and interruption of the parasympathetic input to the lacrimal gland (in the facial nerve). Some may also show signs of vestibular dysfunction (uncommon).

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... Diagnosis of Bell's Palsy Continued

Diagnosis is based on characteristic history, clinical findings, and rule-out of other causes (i.e. ear infection, hypothyroidism).

Prognosis is guarded for full recovery of function of the facial nerve. Recovery may take weeks to months, and there is often some permanence.

Treatment tends to be symptomatic (i.e. use of artificial tears). Corticosteroid use is controversial (due to the lack of inflammation), although it's prescription may have helped in people.

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Motta L, Altay UM, Skerrit GC. Bell's palsy with concomitant idiopathic cranial nerve polyneuropathy in seven dogs. J Small Anim Pract 52(7), 2011: 397.

It has been suggested and hypothesized that a herpes virus infection could be the cause of cranial nerve polyneuropathy – affecting different ganglia. Seven dogs with facial nerve paralysis were fully worked up with imaging, blood tests, EMG studies, & brainstem auditory evoked responses. Pathologic spontaneous muscle fibrillation in the upper and lower lips, masseter & temporal muscles were found on the affected side. Additional findings of partial or complete deafness were also found in these cases. This source cited one human paper and one canine paper that suggested that transient vestibular syndrome is associated with subclinical herpes virus. All seven of the dogs in this study were found to have mild vestibular signs.

Note: Two of the 7 dogs were prescribed prednisolone. It did not change the clinical outcome (in all seven dogs, the palpebral reflex improved, although the eyelid closure was still incomplete).



Morgan, a MN senior Rottweiler that suffered both Bell's Palsy and a concomitant vestibular episode a year prior.

HUMANS

De Almeida JF, Guyatt GH, Sud S et al. Management of Bell palsy: clinical practice guideline. Can Med Assoc J 186(12), 2014: 917 – 922.

In people Bell Palsy may affect 20 – 30 persons per 100000 annually, which means that 1 / 60 individuals will be affected over the course of their lifetime.

The major cause is believed to be an infection of the facial nerve by the herpes simplex virus. As a result the facial nerve swells and is compressed in its canal as it courses through the temporal bone.

Severity or recovery of the nerve function is what guides treatment.

Facial Grading Scales: Sunnybrook scale or House-Brackmann scale

- Mild to moderate paresis have higher rates of recovery than those with severe or complete paralysis.
- 61% recovery for those with complete paralysis
- 91% recovery for those with incomplete paralysis
- 16% of those affected will have residual involuntary movements = synkinesis & others may have abnormal lacrimation with eating (Bogorad syndrome, aka crocodile tears).

Must be careful to protect the cornea in those unable to blink. Lack of lubrication could result in corneal ulceration & permanent visual impairment.

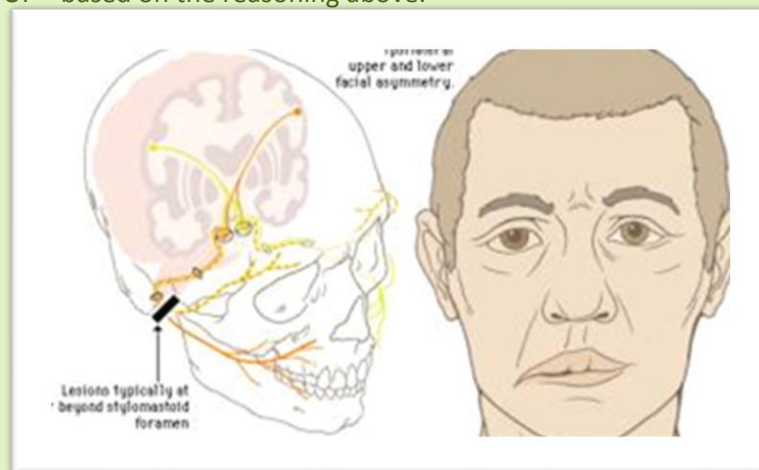
RECOMMENDATIONS:

1. Recommend the use of corticosteroids for all patients with Bell Palsy.
 - Reduces the risk of unsatisfactory facial recovery – especially in severe cases
 - Significant reduction in synkinesis
 - No increased risk of adverse effects (if no medical contraindications)
 - Human dose = 450mg or higher. Best benefit is administered within 48 hrs of onset
2. Recommend AGAINST antiviral treatment alone
 - No reduction in unsatisfactory results
 - No increase in adverse effects
 - No reason to offer this treatment in isolation
3. Recommend AGAINST addition of antivirals to corticosteroids for those with MILD – Moderate severity of symptoms
 - There is a potential reduction in unsatisfactory facial recovery & synkinesis with combo vs steroids alone
 - Not as cost effective
 - Benefit is derived in only 1 / 100 cases

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... Management of Bell palsy continued

4. Recommend FOR combo of antivirals and corticosteroids in pts with severe to complete paresis
 - Improved recovery found in 1 / 14 cases
 - Dosage is uncertain – acyclovir 400mg 5x/day or valacyclovir 1g 3x/day
5. NO recommendation for or against exercise physiotherapy for ACUTE Bell Palsy of any severity.
 - Limited studies of poor quality to go on.
6. Recommendation FOR exercise physio for pts with persistent weakness
 - One study to base recommendation on.
 - Physiotherapy = exercise, stretching & massage.
7. Recommend AGAINST electrostimulation
 - 4 studies reviewed. No benefit. One study showed poorer facial recovery.
 - Added cost.
8. Recommend AGAINST surgical decompression
 - Studies reviewed has serous methodological limitations
 - None or limited benefit
 - Potentially serious risks (hearing loss, further damage, CSF leaks)
9. Recommendation FOR routine use of eye-protection measures
 - Based on common sense & knowledge of what lack of eye lubrication can do. No studies to base the recommendation on.
10. Recommend FOR referral to specialist for cases with no improvement or progressive weakness
 - No studies.
 - Rationale for recommendation – confirmation of diagnosis or to exclude other conditions (i.e. skull-based neoplasms or benign fascial nerve schwannoma – albeit very rare)
11. Recommend FOR imaging to rule out neoplasms or alternative diagnoses for patients with no improvement of those with progressive weakness.
 - MRI or CT – based on the reasoning above.



... Management of Bell palsy continued

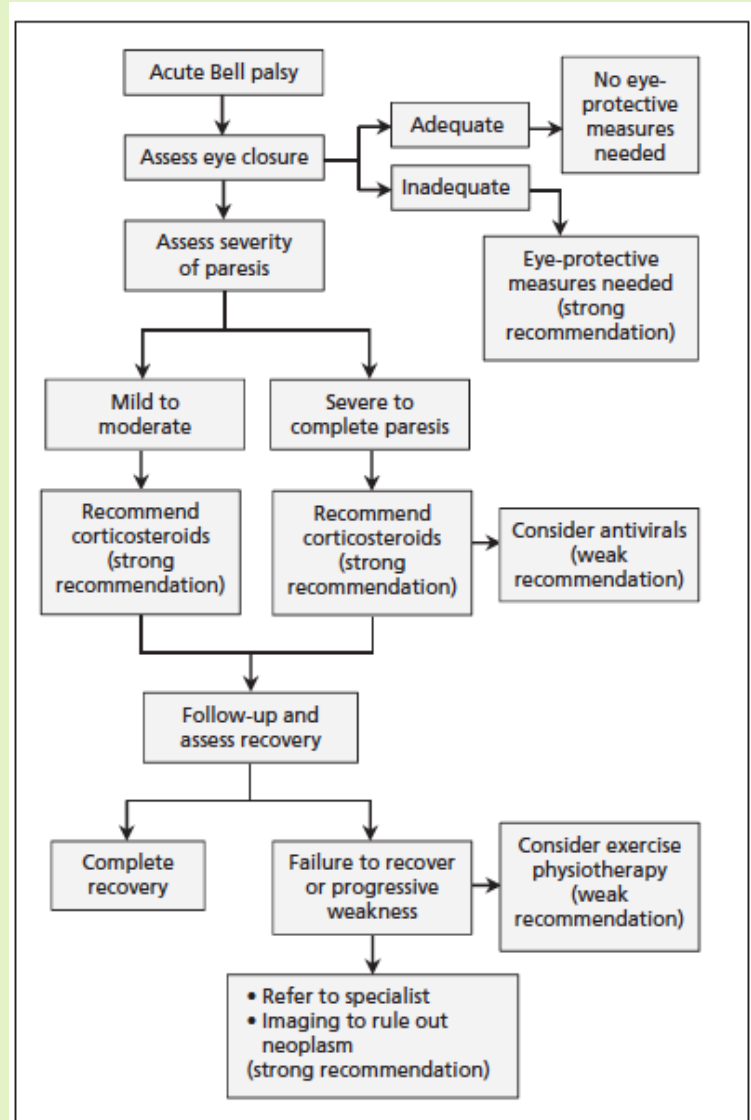


Figure 1: Clinical decision-making algorithm for acute Bell palsy.

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PHYSIOTHERAPY SPECIFIC RESEARCH

Teixeira LJ, Valbuza JS, Prado GF. Physical therapy for Bell's palsy (idiopathic facial paralysis). Cochrane Database Syst Rev Dec 7 (12), 2011.

MAIN RESULTS:

"For this update to the original review, the search identified 65 potentially relevant articles. Twelve studies met the inclusion criteria (872 participants). Four trials studied the efficacy of electrical stimulation (313 participants), three trials studied exercises (199 participants), and five studies compared or combined some form of physical therapy with acupuncture (360 participants).

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... Physical therapy for Bell's palsy continued

For most outcomes we were unable to perform meta-analysis because the interventions and outcomes were not comparable. For the primary outcome of incomplete recovery after six months, electrostimulation produced no benefit over placebo (moderate quality evidence from one study with 86 participants). Low quality comparisons of electrostimulation with prednisolone (an active treatment) (149 participants), or the addition of electrostimulation to hot packs, massage and facial exercises (22 participants), reported no significant differences. Similarly a meta-analysis from two studies, one of three months and the other of six months duration, (142 participants) found no statistically significant difference in synkinesis, a complication of Bell's palsy, between participants receiving electrostimulation and controls. A single low quality study (56 participants), which reported at three months, found worse functional recovery with electrostimulation (mean difference (MD) 12.00 points (scale of 0 to 100) 95% confidence interval (CI) 1.26 to 22.74). Two trials of facial exercises, both at high risk of bias, found no difference in incomplete recovery at six months when exercises were compared to waiting list controls or conventional therapy. There is evidence from a single small study (34 participants) of moderate quality that exercises are beneficial on measures of facial disability to people with chronic facial palsy when compared with controls (MD 20.40 points (scale of 0 to 100), 95% CI 8.76 to 32.04) and from another single low quality study with 145 people with acute cases treated for three months where significantly fewer participants developed facial motor synkinesis after exercise (risk ratio 0.24, 95% CI 0.08 to 0.69). The same study showed statistically significant reduction in time for complete recovery, mainly in more severe cases (47 participants, MD -2.10 weeks, 95% CI -3.15 to -1.05) but this was not a prespecified outcome in this meta-analysis. Acupuncture studies did not provide useful data as all were short and at high risk of bias. None of the studies included adverse events as an outcome."

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Ferreira M, Marques E, Duarte J, Santos P. Physical therapy with drug treatment in Bell Palsy. Am J Phys Med Rehabil. 94(4), 2015: 331 – 340.

Physical therapy as an addition to standard drug therapy in the early stages of Bell's palsy seems to have a positive effect on grade and time recovery (compared to medicine alone).








Therapies

1. External Feedback: Exercises in front of a mirror.
2. Soft-tissue mobilization & hot pack preserve muscle trophism, increase circulation, & reduce involuntary contraction induced by relaxation
3. Electrical stimulation has been discouraged in early stages of Bell's Palsy – as it could interfere with neural regeneration
4. The neuromuscular rehabilitation: (Kabat & Chevalier rehabilitation) Active-assisted movement to guide movement pattern & promote axonal regeneration by improving the neuronal connection & facilitating new motor patterns.
5. Stretching can influence the length-tension relationship of muscles, avoiding mass movement patterns & synkinesis.

FACIAL EXERCISES

			
Sit relaxed in front of a mirror	Gently raise eyebrows, you can help the movement with your fingers	Draw your eyebrows together, frown	Wrinkle up your nose
			
Take a deep breath through your nose, try and flare nostrils	Gently try and move corners of mouth outwards	Try and keep the movement the same on each side of your face	You can use your fingers to help. Once in position take your fingers away and see if you can hold that smile
			
Lift one corner of the mouth then the other			

EXERCISES TO HELP CLOSE THE EYE

				
Look Down	Gently place back of index finger on eyelid, to keep the eye closed	With opposite hand gently stretch eyebrow up working along the brow line. This will help relax the eyelid and stop it from becoming stiff.		
				
Now try and gently press the eye lids together		Narrow eyes as if looking into the sun		

The Bell's Palsy Association
www.bellsalsy.org.uk

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Tuncay F, Borman P, Taser B, et al. Role of electrical stimulation added to conventional therapy in patients with idiopathic facial (Bell) palsy. Am J Phys Med Rehabil 94(3), 2015: 222- 228.

Starting of electrical stimulation at the 4-week mark of palsy improves functional facial movements & electrophysiologic outcome measures at the 3-month follow up.

E-stim protocol used:

- Starting 4 weeks after diagnosis of Bell's Palsy, daily e-stim
- 100 usec pulse duration
- 2.5 Hz pulse rate
- Delivered using carbon electrodes (3cm² anode over each muscle and a 7cm² cathode over the proximal part of the ipsilateral arm)
- Eleven different facial muscles were targeted
- 3 sets of 30 minimal contractions
- 5 days a week for 3 weeks

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Alavat MS, Elsodany AM, Eiky AA. Efficacy of high and low level laser therapy in the treatment of Bell's palsy: a randomized double blind placebo-controlled trial. Lasers Med Sci 29(1), 2014: 335 – 342.

This study compared high intensity laser therapy and low-level laser therapy on the treatment of patients with Bell's palsy. All patients received their respective laser therapy as well as facial massage & exercises.

Rationale for use of laser: Laser has been shown to have a favourable prognosis in the regeneration of peripheral nerves, and decreases or prevents post-traumatic retrograde degeneration of the neurons in the corresponding segments of the spinal cord, and improves axonal growth & myelination.

Laser therapy was targeted to eight points on the affected side of the face three times a week for 6 successive weeks.

Low level laser therapy: 830 nm (GaAs) infrared probe, 100 mW power, 1KHz & duty cycle of 80%, delivering an average energy density of 10 J/cm², and was applied for 2 mins & 5 secs per point for 8 points, delivering a total energy of 80 J.

High level laser therapy: ND:YAG Laser, pulsed emission and 1064 nm, very high peak powers (3 kW), high levels of fluency (energy density) (810–1,780 mJ/cm²), brief duration (120–150 μs), low frequency (10–40 Hz), and a duty cycle of approximately 0.1 %. HILT was applied with contact and perpendicular to the superficial roots of the facial nerve of the affected side. The time of application was 7s/per point with an energy density of 10 J/cm². The total energy delivered to the patient during one session was 80 joules.

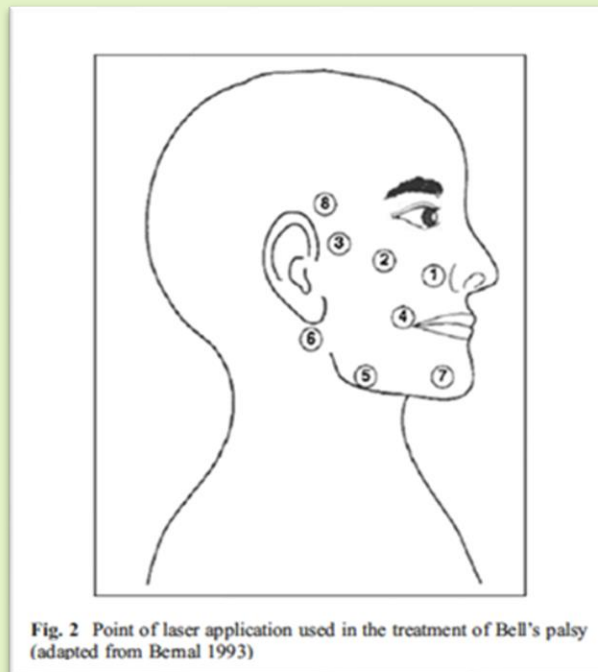
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... Efficacy of high and low level laser therapy in the treatment of Bell's palsy continued

High level laser therapy: ND:YAG Laser, pulsed emission and 1064 nm, very high peak powers (3 kW), high levels of fluency (energy density) (810–1,780 mJ/cm), brief duration (120–150 μ s), low frequency (10–40 Hz), and a duty cycle of approximately 0.1 %. HILT was applied with contact and perpendicular to the superficial roots of the facial nerve of the affected side. The time of application was 7s/per point with an energy density of 10 J/cm². The total energy delivered to the patient during one session was 80 joules.

Treatment consisted of 18 treatments over a 6-week period. Laser was directed over the superficial roots of the facial nerve with direct contact on the skin.

Results showed the both laser therapies significantly improved the recovery of patients with Bell's palsy. High intensity laser therapy was slightly more effective as a treatment modality.



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Exercises for Bell's Palsy. <http://www.facialparalysisinstitute.com/physical-therapy/exercises-for-bells-palsy> accessed Oct 11, 2015.

- Sniffle, wrinkle nose, and flare nostrils
- Curl your upper lip up, and then raise and protrude the upper lip
- Try to smile without showing teeth, then smile showing teeth
- Using your index finger and thumb, pull the corners of your lips in toward the center. Slowly and smoothly push out and up into a smile. Continue the movement up to the cheekbone. Use a firm pressure

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... Exercises for Bell's Palsy continued

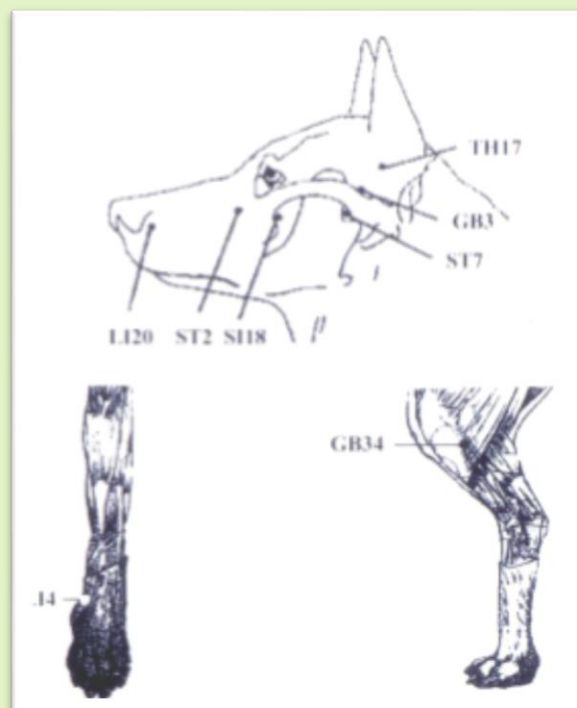
- Try to close the eye slowly and gently, without letting your mouth pull up or your eyebrow move downward
- Try to raise your eyebrows, and then hold for 10 -15 seconds. Pause, and repeat.
- Gently wink with one eye, and then try the other one. Do it to the best of your ability, and do not push it.
- Open eyes widely, but without involving your eyebrow. Stop if you see any inappropriate muscle actions.

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ACUPUNCTURE SPECIFIC RESEARCH

Jeong SM, Kim KY, Lee CH et al. Use of acupuncture for the treatment of idiopathic facial nerve paralysis in a dog. Vet Rec 148(20), 2001: 632 – 633.

Described one case of a dog that had not responded to previous medical (prednisolone) treatment over the previous 35 days. Acupuncture was used on local points LI 20, ST2, ST7, TH17 & GB3 and distal acupuncture points GB 34 & LI 4. Local points were treated contra laterally and the distal points were treated bilaterally for 20 minutes. The dog was treated every other day for the first two weeks and then once a week for the next three. Artificial tear solution was also used. Continuous improvement was observed, and at the end of treatment, complete symmetry of the face was achieved, ear movement and sensation was normal and the eyelids could be closed voluntarily.



Acupoints utilized in humans with Bell's Palsy... (transferred to dogs)

<http://www.livestrong.com/article/529351-acupuncture-points-for-bells-palsy/>
and

https://theory.yinyanghouse.com/treatments/acupuncture_for_bells_palsy

Accessed October 15th, 2015

ST 4: At the corner of the mouth, in a line directly below the pupil

ST 7: In the depression where the cheekbone and jaw meet

LI 20: In the nasolabial crease

GB 14: In line with the pupil, about 1 digit-width above the eyebrow

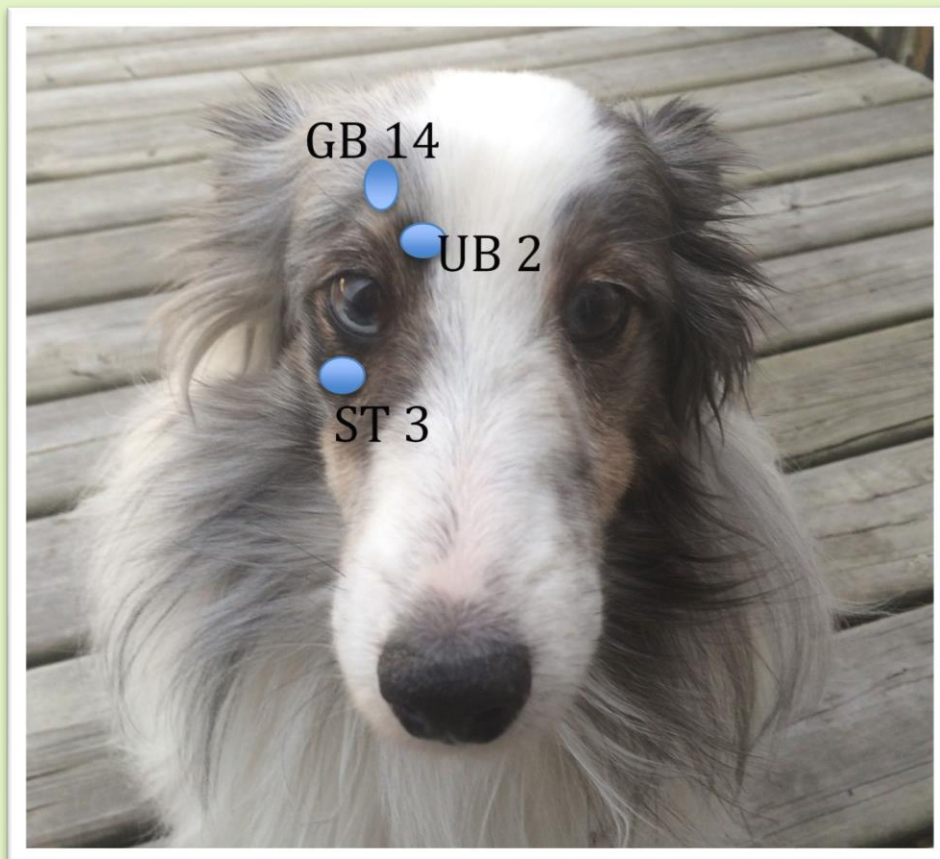
ST 3: Directly below the pupil in a depression at the level of ala nasi

LI 4: On the opposite side: In the first interosseous muscle at the midpoint of the 2nd metacarpal bone.

UB 2: On the medial end of the eyebrow, directly above the inner canthus of the eye

GB 1: Half a digit width lateral to the outer canthus of the eye in a depression on the lateral side of the orbit

SI 18: Directly below the outer canthus of the eye in a depression on the lower border of the zygoma.





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