



## **Physiotherapeutic Treatment Of Radial Nerve Paralysis By Infrared Radiation In A Stallion**

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### **ABSTRACT**

*The present paper describes treatment of radial nerve paralysis by physiotherapy (thermotherapy by infrared radiation and massage) in a stallion. Treatment included infrared therapy by Infra Red Lamp (IRL) for 15 minutes each in morning and evening (fig. 2). The source of infrared light was kept 25-30 cm away from part being treated. After one hour of infrared therapy, the whole affected limb was massaged with ammonia liniment. Supportive therapy included injection vitamin B-complex. Adequate rest was provided to animal. Controlled exercise of the animal was started when clinical signs (neurologic function) began to improve. This treatment was continued for six weeks. The animal recovered day by day and completely recovered after six weeks of the treatment.*

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### **INTRODUCTION**

Radial nerve, the largest branch of the brachial plexus innervates the extensor muscles of the elbow, carpus digit and supplies the lateral flexor of the carpus. Paralysis of the radial nerve as a primary cause of lameness is an uncommon condition and most often depicted as dropping of the elbow, knuckling over of the carpus and toe so that the dorsal surface of the hoof rests upon the surface of the ground and the affected limb appears longer than normal. In most cases, paralysis of the radial nerve is due to trauma of the shoulder region caused by hyperextension of the forelimb or extreme abduction of the shoulder (Rijkenhuizen *et al.*, 1994). Tumors, abscesses and enlarged axillary lymph nodes occurring along the course of the nerve, fractures of the humerus, first rib, seventh cervical and first thoracic vertebrae can also result in radial nerve paralysis (Lopez *et al.*, 1997). Various treatment methods for radial nerve paralysis are used viz. anti-inflammatory therapy with stall rest, application of a PVC bandage splint and physiotherapy. Physiotherapy is a very uncommon method of treatment in veterinary medicine which deals with the treatment of disease by physical methods (Tyagi and Singh 1993) and begins with essential applied background information on animal behavior, nutrition, biomechanics and exercise physiology (Catherine *et al.*, 2007). It helps to correct deformities, develops paralyzed muscles, nerves, makes joint movement more supple and prevent deforming tendencies. The present paper describes treatment of radial nerve paralysis by physiotherapy (thermotherapy by infrared radiation and massage) in a stallion.

### **HISTORY AND CLINICAL EXAMINATION**

A 2 years old stallion was presented to Teaching Veterinary Clinical Complex (TVCC), College of Veterinary Science and Animal Husbandry, Kumarganj, Faizabad (UP) with the complaint of no weight bearing on the left forelimb since last one week. Detailed enquiry revealed that the animal was on daily exercise and fallen down on the uneven surface. Physical examination by palpation revealed swelling and pain in shoulder region and no fracture of humerus or dislocation of shoulder joint was found. On clinical examination, there was dropped elbow and dorsal aspect of the toe was touching the ground (fig. 1). The animal was dragging affected limb during movement. Rectal temperature, heart rate and respiration rate were within normal physiological limits. Based on physical and clinical examinations the case was diagnosed as radial nerve paralysis.

### **Treatment:**

Treatment included infrared therapy by Infra Red Lamp (IRL) for 15 minutes each in morning and evening (fig. 2). The source of infrared light was kept 25-30 cm away from part being treated. After one hour of infrared therapy, the whole affected limb was massaged with ammonia liniment. Supportive therapy included injection vitamin B-complex. Adequate rest was provided to animal. Controlled exercise of the animal was started when clinical signs (neurologic function) began to improve. This treatment was continued for six weeks. The animal recovered day by day and completely recovered after six weeks of the treatment (fig. 3).

## DISCUSSION

The paralysis radial nerve is very uncommon condition. In most cases, it is encountered following trauma to the shoulder region caused by hyperextension of the forelimb or extreme abduction of the shoulder (Rijkenhuizen *et al.*, 1994) as it was seen in present case also. There have been isolated reports of radial nerve paralysis included in a generalized distal axonalopathy (Furuoka *et al.*, 1998). Prolonged lateral recumbency while under general anesthesia on an operating table or while on the ground may also produce a radial-paralysis like syndrome in the forelimb next to a hard surface (Mackay, 2006). Episodes of ischemia are likely to cause neuropractic conduction changes and permanent nerve changes if prolonged (Mackay, 2006). The signs vary depending upon the extent or degree and location of paralysis. In most of the cases, the shoulder is extended, the elbow is dropped (dropped elbow appearance) and the affected limb appears longer than normal. With complete radial nerve paresis the horse is generally reluctant to move, and at a walk the limb is dragged forward passively by the action of the proximal pectoral, biceps brachii, and coracobrachialis muscles, with the dorsal surface of the hoof in contact with the ground. Due to the physical stress associated with radial nerve paralysis, some horses may sweat profusely and have an elevated pulse and respiration (Rijkenhuizen *et al.*, 1994). However, in the present case, horse was sweating but respiratory rate and pulse rate were within normal range. Various treatments consisting anti-inflammatory therapy, stall rest, application of a bandage splint and controlled exercise are used to treat radial nerve paralysis. The present case was treated with physiotherapy (thermotherapy by infrared radiation and manual massage of the affected limb). The infrared radiation generates therapeutic heat which causes vasodilatation, increases blood flow, analgesia, increased metabolic activity within the cells, increased tissue extensibility, decrease in joint stiffness. Eells *et al.*, (2004) have shown that red to near-infrared light promotes mitochondrial oxidative metabolism, activates antioxidation and protects against cell damage. A variety of studies have determined that light in the red to near-infrared range provides the optimal conditions for biostimulation (Fitzgerald *et al.*, 2010). Donnelly and Wilton (2002) reported that massage therapy (MT) may speed healing and reduce pain by mechanical means. The manipulations and pressure of MT may break down subcutaneous adhesions, prevent fibrosis, promote circulation of blood and lymph (Fritz, 2000) and processes that may lead to reductions in pain associated with injury or strenuous exercise. Thus thermotherapy with infrared radiation and massage therapy help to correct deformities, develop paralyzed muscles and nerves. Controlled exercise is started when clinical signs (neurologic function) begin to improve. The amount of exercise is dictated by the horses' capabilities. In most cases of radial nerve paralysis the prognosis is guarded to poor (Cauvin *et al.*, 1993). However, compression and entrapment injuries often lead to partial or complete recovery.

## SUMMARY

The case of radial nerve paralysis in a stallion was successfully treated with physiotherapy (Infrared therapy and massage) and animal recovered uneventfully within six weeks.

## REFERENCES

1. Catherine Mc Gown, Lesley Goff and Narelle Stubbs (2007). *Animal Physiotherapy*. 1st Edn., Blackwell publishing, U.K. pp.1
2. Cauvin E, Munroe G, Mitsopoulos A. (1993). Peripheral neuropathy involving the brachial plexus nerves in two horses. *Equine Veterinary Education*, 5:90-94.
3. Donnelly, C. J., & Wilton, J. (2002). The effect of massage to scars on active range of motion and skin mobility. *The British Journal of Hand Therapy*, 7(1), 5-11.
4. Eells, J. T., Wong-Riley, M. T., VerHoeve, J., Henry, M., Buchman, E. V., Kane, M. P, Margolis, D. (2004). Mitochondrial signal transduction in accelerated wound and retinal healing by near-infrared light therapy. *Mitochondrion*, 4(5), 559-567.
5. Fitzgerald, M., Bartlett, C. A., Payne, S. C., Hart, N. S., Rodger, J., Harvey, A. R., Dunlop, S. A. (2010). Near infrared light reduces oxidative stress and preserves function in CNS tissue vulnerable to secondary degeneration following partial transection of the optic nerve. *Journal of neurotrauma*, 27(11), 2107-2119.
6. Fritz, S. (2000). *Mosby's Fundamentals of Therapeutic Massage*. Mosby. Inc. St Louis Missouri.

7. Furuoka H, Okamoto R, Kitayama S. (1998). Idiopathic peripheral neuropathy in the horse with knuckling: muscle and nerve lesions in additional cases. *Acta Neuropathol*, 96:431–437.
8. Lopez MJ, Nordberg C, Trostle S. (1997). Fracture of the 7<sup>th</sup> cervical and 1st thoracic vertebrae presenting as radial nerve paralysis in a horse. *Can Vet J*, 38:112.
9. Mackay R. (2006). Peripheral Nerve Injury. In *Equine Surgery*, 3rd ed. Auer J, Stick J, eds. Saunders Elsevier, St. Louis, 684–691.
10. Rijkenhuizen A, Keg P, Dik K. (1994). True or false radial nerve paralysis in the horse. *Veterinary Annual*, 34:126–133.
11. Tyagi, R.P.S. and Singh, Jit. (1993). *Ruminant Surgery*. 1st Edn., CBS Publishers and Distributors, New Delhi. pp.380



**Figure-1.** Radial nerve paralysis evidenced by the classical dropped elbow stance and toe touching the ground.



**Figure-2.** Animal is being treated with Infrared therapy by Infra Red Lamp.



**Figure-3.** Recovered animal bearing weight on affected limb.

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