

# Referred muscle pain is primarily peripheral in origin in the “barrier-dam” theory

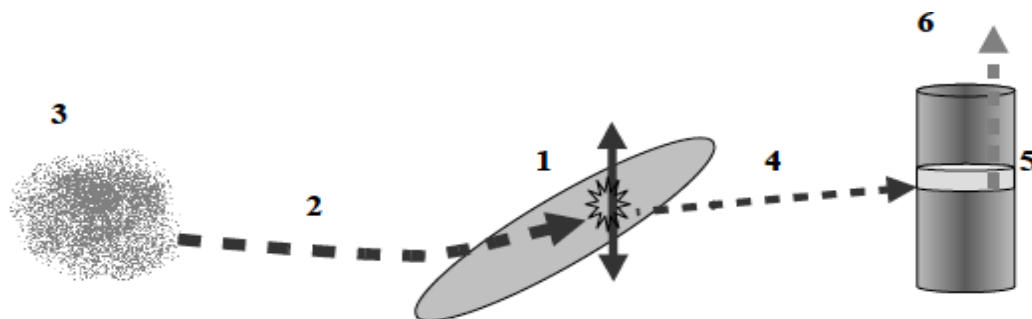
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**BACKGROUND:** When deep pressure by palpation is used on a subject with smooth fibrotic lesions in a muscle [myofibrosis], RP can originate as a hyperalgesic cutaneous area, adjacent to, or totally apart from the pressure pain locus.

**APPROACH:** It is currently postulated that a chain reaction is activated implicating triggering of an ever-increasing number of afferent neurons and facilitation of the synaptic connection at the level of the spinal cord, causing more distally a distributed RP via convergent efferent pathways.

**RESULTS:** The human interpretation of this phenomenon can be misleading when the tested person positions, after a few seconds, his RP from the site of pressure to the distally located RP area. As a result of what we have found in our experimentally induced RP probes, we hypothesize that deep pressure on a myofibrosis will, in the first place, within a few seconds, increase the nociceptive excitability of the afferent sensitive nerves from the RP area to the local spot of pressure on the muscle, which in return will, in the second place, excite the whole dependent RP area. The proposed mechanism for referred muscle pain is linked to the “pre-local hyper-excitability” or “barrier-dam” hypothesis. The afferent sensitive peripheral nerves might be entrapped in local muscle hardenings [barrier-dam] with the consequence of the hyper-excitation of pre-local sensitive afferent nerves between the distally referred pain area and the local muscular zone of tenderness (Fig. 1).



**Fig.1** In the new 'barrier-dam' hypothesis, it is postulated that the signals are conducted by the 'upstream' part of the primary afferent neurons ("2") from the RP area ("3") to the site of the entrapment ("1") through a hard myofibrosis (the vertical staff = barrier) and signals are secondarily transmitted via the 'downstream' part of the same primary afferent neurons ("4") via the dorsal horn of the spinal cord ("5") to the central nervous system ("6"). The correct interpreting comes, from the distal to proximal direction (afferent) of the painful sensation.

**CONCLUSIONS:** The primary pathogenesis of referred muscle pain is likely to be a peripheral sensitization with additionally a central modulation and not vice versa. Clinical and fundamental studies with experimentally induced RP are nevertheless needed to examine the new “barrier-dam” hypothesis.

**REFERENCE:** Farasyn A. Referred pain is primarily peripheral in origin: The “barrier-dam” theory. *Med Hypotheses* 2007;68:144-50.