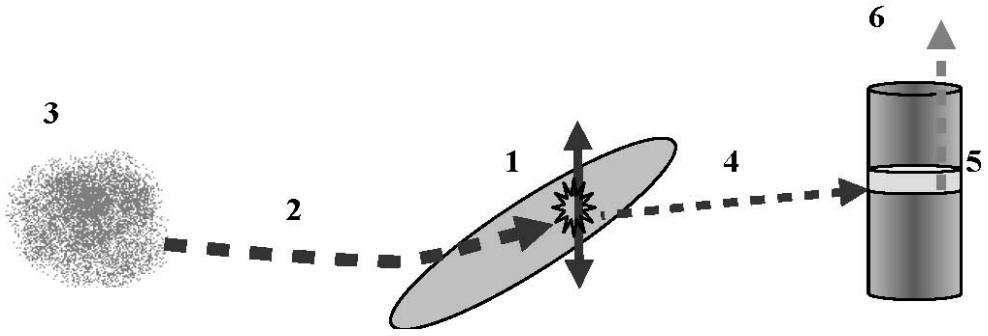
Referred Muscle Pain is Primarily Peripheral in Origin in the "Barrier-Dam" Hypothesis

Farasyn Andre PhD PT, DO, Fac. Phys. Educ. & Rehabil. Sciences, Vrije Universiteit Brussel (VUB) Laarbeeklaan 103, 1090 Brussels Belgium Tel.: +32.2.477.45.29 email: andre.farasyn@vub.ac.be

BACKGROUND: When deep pressure by palpation is used on a subject with smooth fibrotic lesions in a muscle [myofibrosis], referred muscle pain (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, within a few seconds, increase the nocioceptive excitability of the afferent sensitive nerves *from the RP area to the local spot of pressure on the muscle*, which in return will, 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 nerve 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.