Editorial

Muscular Pains and Aches

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Introduction:

Muscle pain is common. It also known as myalgia, can be caused by injuries, infectious diseases, or other health issues. It can be temporary or chronic as well as localized or widespread throughout the body; its intensity varies from person to person. Everyone can experience muscle soreness. People who start a new physical activity regimen can experience delayed-onset muscle soreness, typically occurring 6 to 12 hours after exercise and may persist for up to 48 hours. During this time, you may experience pain as your muscles are recovering.

Muscle pain is evoked by specialized nerve endings (nociceptors). Important stimuli for muscle pain are Adenosine Triphosphate (ATP) and a low tissue pH. Excitation of muscle nociceptors leads to hyperexcitability of spinal sensory neurones (central sensitization). Low frequency activity in muscle nociceptors is sufficient to induce central sensitization.

In the majority 60% to 85% of the population has had nonspecific back pain of muscular origin[1]. Pain evoked by myofascial trigger points has a point prevalence of approximately 30%[2]. More than 7% of all women aged 70 to 80 years suffer from the fibromyalgia syndrome[3]. In an Italian study, musculoskeletal pain was found to be the most common reason that patients consulted a doctor[4].

Muscle pain differs in many ways from pain in the skin or viscera. These differences concern not just the underlying mechanisms, but also a number of subjective features. The main subjective differences between muscle pain and cutaneous pain are listed below:

- In muscle pain electrical nerve stimulation induces only one pain whereas in cutaneous pain it induces a first pain and a second pain.
- Muscle pain is poorly localizable whereas the other is well-localized.
- It has tearing, cramping, pressing quality whereas the cutaneous pain has stabbing, burning, cutting quality.
- It marked tendency toward referral of pain and the cutaneous pain has no tendency toward referral of pain.
- The affective aspect of muscle pain has difficult to tolerate whereas he cutaneous pain it is easier to tolerate.

The main symptoms of muscle pains are muscle soreness, cramps, spasms and joint pain

Types and mechanisms

There are mainly two types of muscle pain and mechanism:

Peripheral mechanisms

Muscle pain is produced by the activation of specific receptors (so-called nociceptors): these receptors are specialized for the detection of stimuli that are objectively capable of damaging tissue and that are subjectively perceived as painful.

Muscle nociceptors contain neuropeptides, including substance P (SP) and calcitonin-gene-related peptide (CGRP). These peptides are released when nerve endings are activated and induce local edema by dilating the local blood vessels and increasing their permeability.

ATP is released in any kind of tissue injury, it can be considered a universal pain-inducing substance[5]. ATP is found in particularly high concentration in muscle cells; it can cause pain in muscle trauma (e.g., a bruise or tear of muscle fibers) as well as in other types of pathological change in muscle (e.g., necrotizing myositis)[6].

Acidic tissue pH is one of the main activating factors leading to muscle pain. Practically all pathological and pathophysiological changes of skeletal muscle are accompanied by a drop in pH, among them

- chronic ischemic states,
- tonic contractions or spasms,
- myofascial trigger points,
- (occupationally induced) postural abnormalities, and
- myositides.

In this way, neurogenic inflammation comes about, characterized by hyperemia, edema, and the release of inflammatory mediators[7]. The inflammatory mediators sensitize the muscle nociceptors and thereby increase neuropathic pain.

It is also the reason why many types of muscle pain respond well to the administration of non-steroidal anti-inflammatory drugs (NSAID), which block prostaglandin synthesis.

Central nervous mechanisms

An influx of nervous impulses from muscle nociceptors into the spinal cord increases the excitability of posterior horn neurons to a greater extent than one from cutaneous nociceptors[8].

Tenderness to pressure and pain on movement or exercise. The over excitability of nociceptive neurons in the CNS is considered the main cause of allodynia and hyperalgesia in patients with chronic muscle pain. The persistent depolarization of the sensitized cells has recently become the target of medications that open potasium channels and thus remove positive charge from the cell[9].

Muscle spasm can be defined as persistent, involuntary muscle contraction (not including spasticity, a phenomenon of central nervous origin). The main

reason why pain arises in muscle spasm is muscle ischemia, which leads to a drop in pH and the release of pain-producing substances such as bradykinin, ATP, and H+.

The vicious-circle concept of muscle spasm – muscle pain causes spasm, which causes more pain, etc. – should now be considered obsolete. Most studies have shown that muscle pain lowers the excitability of the α-motor neurons innervating the painful muscle[10] (a "pain adaptation" model)[11].

Causes

Muscle pains and aches (myalgia) are extremely common. Almost everyone has experienced discomfort in their muscles at some point.

While overuse or injury is common, there are other possible explanations for ongoing discomfort. Some common causes include:

- muscle tension in one or more areas of the body
- overusing the muscle during physical activity
- injuring the muscle while engaging in physically demanding work or exercise
- skipping warmups and cool downs

Some medical explanations for myalgia include:

- fibromyalgia, especially if aches and pains last longer than 3 months
- chronic fatigue syndrome
- myofascial pain syndrome, which causes inflammation in muscular connective tissues called fascia
- infections, such as the flu, polio, or bacterial infections
- autoimmune disorders such as lupus, dermatomyositis, and polymyositis
- use of certain medications or drugs, such as statins, ACE inhibitors, or cocaine
- thyroid problems, such as hypothyroidism or hyperthyroidism
- hypokalemia (low potassium)

In the medical emergency:

- a sudden onset of water retention or a reduction in urine volume
- difficulty swallowing
- vomiting or running a fever
- trouble catching your breath
- stiffness in your neck area
- muscles that are weak
- an inability to move the affected area of the body

Diagnosis

If the cause of your muscle pain is unknown or you experience severe or chronic muscle pain, doctors may order additional tests.

- **Blood tests** can help determine your enzyme, hormone, and electrolyte levels and check for signs of infections.
- **CT scan or MRI** can identify muscle damage.
- **Electromyography (EMG)** can measure the electrical activity in nerves and muscles and evaluate nerve and muscle function.
- **Muscle biopsy.**

These additional tests can help your doctor make a proper diagnosis and treatment plan.

Treatment

Temporary muscle pain can usually be relieved by resting, stretching, or taking pain relievers.

- Rest and elevate the affected area to reduce the strain.
- Apply a cold compress to relieve inflammation and a hot compress to improve blood circulation in the sore muscles.
- Take a warm shower or bath to relax your muscles.
- Take pain relievers

Easing muscle aches at home

Some measures at home you can take to relieve muscle discomfort from injuries and overuse include:

- resting the area of the body where you're experiencing aches and pains
- taking an over-the-counter pain reliever
- applying ice to the affected area to help relieve pain and reduce inflammation

Other measures that may provide relief from muscle pain include:

- gently stretching the muscles
- avoiding high-impact activities until after the muscle pain goes away
- avoiding weight lifting sessions until the muscle pain is resolved
- giving yourself time to rest
- doing stress-relieving activities and exercises such as yoga and meditation to relieve tension

Natural Pain Reliever

People have used essential oils, herbs, and alternative therapies as natural pain relievers for hundreds of years. Researchers have not fully explored these options, but some evidence suggests that certain remedies can help, and that many people find them useful.

Lavender essential oil: Lavender essential oil may help relieve pain naturally. People use lavender oil for pain relief, to help sleep, and to ease anxiety. A small-scale 2012 study found that inhaling lavender oil may relieve pain associated with migraine headaches compared with a placebo. Some research also suggests that lavender oil has pain-relieving, anti-inflammatory, and antioxidant effects.

Peppermint essential oil: Peppermint oil comes from the Mentha piperita L. plant. Some research suggests that the peppermint plant has anti-inflammatory, antimicrobial, and pain-relieving effects. The active compounds in peppermint oil include carvacrol, menthol, and limonene.

People often use diluted peppermint essential oil as a topical treatment, meaning that they rub diluted oil into the area that feels achy or painful.

One 2015 review notes that people have traditionally used peppermint to relieve painful spasms and problems associated with arthritis. The researchers also

report that applying peppermint oil to the temples and forehead may relieve tension headache pain.

Cloves: People have traditionally used cloves, from the Eugenia caryophyllata plant, as a home remedy to relieve pain from toothache. A 2006 study found clove gel to be as effective as benzocaine gel, which is a topical gel that dentists often use to reduce needle pain. The researchers applied clove, benzocaine gel, or a placebo to the inside of the participants' mouths. They reported lower levels of pain with both clove and benzocaine gels, but not with placebos. More research is needed to see how effectively cloves could relieve other sorts of pain. Researchers also believe that clove can have antioxidant, anti-inflammatory, anti-fungal, and anti-viral activity.

Capsaicin: People also use capsaicin, present in chilli peppers, for natural pain relief. This substance can cause a mild burning or tingling sensation when a person applies it topically. A 2011 study notes the important role that capsaicin topical creams and patches play in pain management. Many pain-relieving products contain capsaicin. Researchers are not yet sure why it relieves pain, but some believe that it reduces the skin's sensitivity to pain by working on the nociceptor fibres. These are nerves that carry pain signals.

Ginger: Ginger, or Zingiber officinale, is a root that shows promise as a natural pain reliever. A 2015 systematic review found that ingesting two grams of ginger per day modestly reduced muscle pain from resistance exercise and running when people took it for at least five days. The researchers also suggest that ginger may accelerate recovery and reduce inflammation related to exercise.

Try including ginger in the diet by adding raw ginger to smoothies or teas. People can also use ginger supplements. However, the natural, fresh ingredient may be more healthful.

Turmeric: Curcuma, the active ingredient in the spice turmeric, has pain-relieving qualities. A small-scale 2014 study found that curcuma extract is as effective as ibuprofen for pain management in the treatment of knee osteoarthritis when a person takes it for four weeks. Turmeric is also a common herbal remedy for reducing inflammation. To include turmeric in its natural form in the diet, try adding it to curries, smoothies, or juices.

And also fish oil, vitamin D, calcium, magnesium, Vitamin C, green tea extract and garlic.

Tips for preventing sore muscles

If your muscle pain is caused by tension or physical activity, take these measures to lower your risk of developing muscle pain in the future:

- Stretch your muscles before engaging in physical activity and after workouts.
- Incorporate a warmup and a cool down into all of your exercise sessions, around 5 minutes each.
- Stay hydrated, especially on days when you're active.
- Engage in regular exercise to help promote optimal muscle tone.
- Get up and stretch regularly if you work at a desk or in an environment that puts you at risk for muscle strain or tension.

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