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REVIEW ARTICLE

A Study about the Treatment Methods According to Each Pain Region of the Body in Dancers

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ABSTRACT

Background. Dancers experience frequent pain and injuries as they perform the same training and movements every day. Therefore, if pain caused by repeated movements is treated early, training effectiveness will improve, which will lead to improved performance. **Objectives.** The purpose of this study is to suggest a method of treating pain based on published papers that have been studied so far. **Methods.** This study has searched the scientific literature published between 2000 and 2023. Indexed terms and text words such as dance, dancer, sports injury, musculoskeletal pain, treatment, initial treatment, recovery, and dance effect. **Results.** Pain was prevalent in the head, lower back, foot, and legs including the hip joint, and injuries were also concentrated in the lower extremity and lower back region. **Conclusion.** The treatment method proposed in this study is expected to be helpful in treating pain in dancers through analysis of the structural causes, considering that the cutaneous nerve, which easily feels pain, is a treatment target that should relax the structures in the path to the superficial fascia.

KEYWORDS: ***Dancers, Treatment, Musculoskeletal Pain, Headache, Injury.***

INTRODUCTION

Dancers often experience physical injuries or pain due to excessive joint movements and practice for durability, which causes them to be unable to demonstrate their skills in actual performances. The most common musculoskeletal pain or injuries in dancers are in the lower extremities. The incidence of thigh injury in dancers is reported to be approximately 20%, with musculoskeletal region and pain having even higher incidences (1). In particular, it has been reported that excessive stretching can cause hamstring injuries in dancers, with 12-31% cases of reinjury (2). Other studies reported that the injury region of the lower extremity includes the quadriceps, adductors, iliotibial band, and bone (3).

Although there are several experimental studies to show that dance has a positive effect on the central nervous system, such as Parkinson's, and to prevent injuries, it should be considered important in sports science that frequent injuries have a negative impact in terms of performance and treatment purposes (4-9). For the dancer who practices dance every day, the best way to prevent musculoskeletal injury or pain is to do well recovery after practice every day (10).

Pain ultimately comes from sensory nerves, and it is the cutaneous nerves that are sensitive to pain. However, since the human body is not made up of muscles and nerves independently, it is necessary to analyze the entire whole body and think about the cause of the pain. Therefore, analyzing the area where pain is felt and the imbalance in the body is important to understanding body balance and pain (11, 12).

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The purpose of this study is to suggest a method of treating pain based on published papers that have been studied so far.

MATERIALS AND METHODS

This study has been searched in the scientific literature published between 2000 and 2023. Indexed terms and text words such as dance, dancer, sports injury, musculoskeletal pain, treatment, initial treatment, recovery, and dance effect. And then this study examined the reference lists of all relevant studies. Then, for each study found, injuries, pain, recovery methods were organized, made into one table, and analyzed (Figure 1).

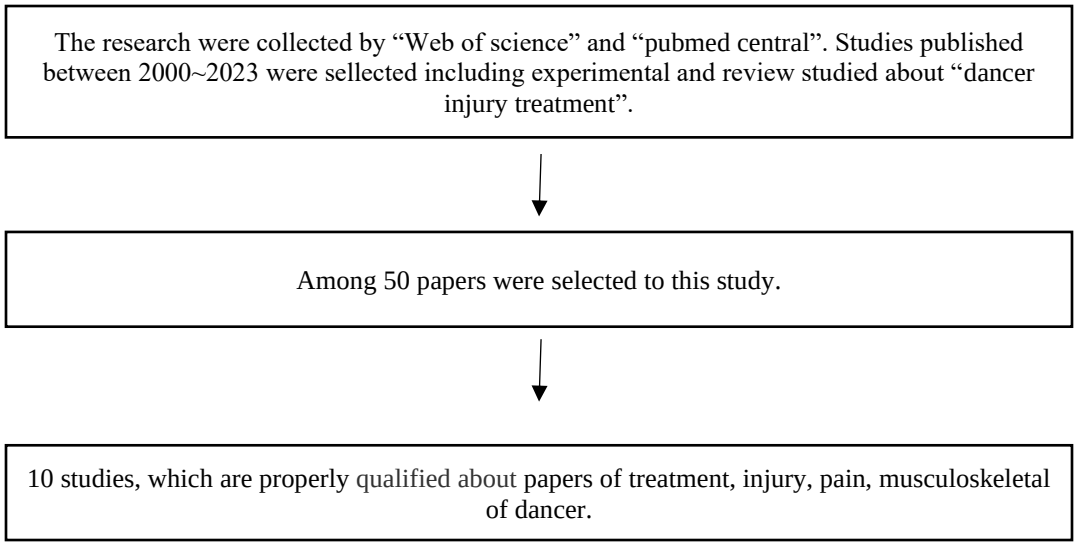

Figure 1. The processing of this study.

RESULTS

This study investigated about where the dancers experienced pain or injury region. According to research in Sweden in 1994, the lower back, foot, ankle, and neck regions were reported to be painful regions. In a study reported in America between 2010 and 2017, the hamstring, adductor muscles, and iliotibial tract were reported as the injury region, and the lumbosacral, hip, and patellofemoral region were reported as the pain region. In 2019 in the UK, knee, lumbar, foot, and ankle were reported as injured areas. According to two studies reported in Germany, the pain regions were the head, trunk, and lower limb, which were the same in both studies. A Croatian study reported back, knee, and toe pain, and a study published in Irish reported pain in the knee, leg, and plantar region, and was diagnosed with a problem with the foot bones. According to a recently published study in China, it was reported that pain occurred in the achilles region and forefoot and midfoot regions (Table 1).

DISCUSSION

Back pain is a common symptom among dancers and a propounding health problem that increases with age and cannot be resolved by decreasing training intensity (13). According to another study (14), patients did not think much of the importance of diagnosis, drug treatment, or surgery, and medical staff did not do enough to explain the cause of pain to patients. In many cases, it is difficult to find the cause of back pain, so the primary approach is to find the tight region and apply pressure as a noninvasive treatment method (15, 16). Depending on the direction of attachment of the muscles around the lower back that attach to the lumbar vertebra and iliac crest, there is a method of palpating and gently pressing the area that feels a little hard and waiting until it loosens. Also, it is a good way to relieve it in the same way as above by palpating the hamstring muscles based on the origin of the hamstring muscles in the ischial tuberosity in the lower part of the pelvic bone. This is because back pain often occurs due to the shortening of the hamstrings (17, 18).

Table 1. The pain and injury region

population	Year	Pain or diagnosis	injury
American (3)	2010		Hamstring Iliotibial tract Adductor
Croatia (13)	2015	Back pain (53.5%) Knee (43%) Toe (40.5%)	
Irish (19)	2023	Ankle sprain Posterior tibialis tendonitis Patellofemoral pain syndrome Plantar fasciitis	Sesamoid, metatarsal, navicular, 1stproximal phlalnx, tibia
Sweden (20)	1994	Low Back Foot, ankle neck	
UK (21)	2019		Knee (36%) Lumbar (19%) Foot and ankle (15%)
American (22)	2017		Hip and groin
American (23)	2015	Lumbosacral pain (62%) Snapping hip (58%) Patellofemoral pain (29%)	Lower extremity (66%-91%) Foot and ankle (14%-57%)
Chinese (24)	2022	Archilles region Forefoot and midfoot	
Germany (25)	2019	Lower limb in Ballet dancer Head and trunk in JMC	
Germany (26)	2021	Lower extremity Head Trunk	

JMC: jazz/modern/contemporary dancers.

The pain in the head with the neck was included in previous studies (Table 1). Anatomically, structures sensitive to pain in the head region include the periosteum, meninges, and scalp, and the trigeminal nerve innervates as the sensory function (27). A few of researches were reported that the reason of head pain was a trigger point of the near muscle of the head and neck (28-30). The greater and lesser occipital nerves that cause headaches are affected by the structures of the neck and shoulders, so in a headache, it would be good to find the trigger point in the above region and recover. The myodural bridge also might be related to headaches (31). In the dura mater in the vertebral foramen, and it is reflected that the relaxation of these muscles affects the circulation of cerebrospinal fluid and has a positive effect on the purpose of recovery of the human body (31). The muscles forming the suboccipital triangle are attached to the superior and inferior nuchal line based on the external occipital protuberance. Therefore, it is believed that the method of relaxing muscles by providing physical stimulation centered on the above bony landmark will help treat headaches and improve the overall physical condition by promoting cerebrospinal fluid circulation (Figure 2; 32).

Pain in the back of the leg is handled by the posterior femoral cutaneous nerve. Since this nerve passes through the back of the thigh, relaxation of the hamstring muscles can be effective in reducing pain in the region (33). According to Table 1, this study recommends relaxing the hamstring as a treatment method for feeling pain in the posterior leg. Structurally, depending on the condition of the hamstrings or fascia, abnormal sensations may be felt in the affected cutaneous nerve (Figure 3; 34).

According to another study (35), various causes of foot pain in dancers have been reported as interdigital neuromas, tarsal tunnel syndrome, medial hallucal nerve compression, anterior tarsal tunnel syndrome, superficial and deep peroneal nerve entrapment, and sural nerve entrapment (Figure 4). Although there are cases where the exact cause of various pain cannot be diagnosed, tarsal tunnel syndrome is usually caused by the tibial nerve passing through the tarsal tunnel and becoming the plantar nerve, which is the nerve responsible for motor and sensory function on the plantar region (36). Therefore, pain in the plantar

region or ankle is caused by the tarsal tunnel. This study thought that there are many cases where the pressure increases and causes pain. The structures that pass through the tarsal tunnel are the tibial nerve, tibialis posterior, flexor digitorum longus, and flexor hallucis longus. For dancers with pain in the plantar or ankles, if the back of the tibia is tight when palpated, it is a good idea to relax this region (37). Although it is good to analyze the body type of a dancer in pain, it is also recommended to identify and treat the cutaneous nerve, which is responsible for the pain region.

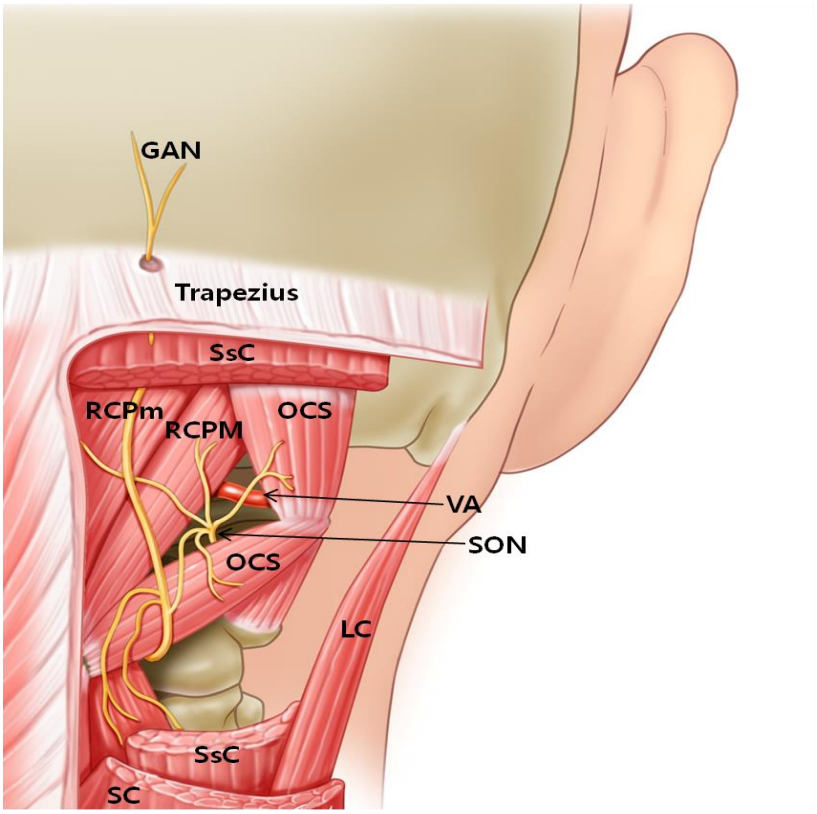

Figure 2. The suboccipital structures related to headache. GAN, greater occipital nerve; SsC, semispinalis capitis; OCS, oblique capitis superior; RCPm, rectus capitis posterior minor; RCPM, rectus capitis posterior major; VA, vertebral artery; SON, suboccipital nerve; LC, longissimus capitis; SC, splenius capitis.

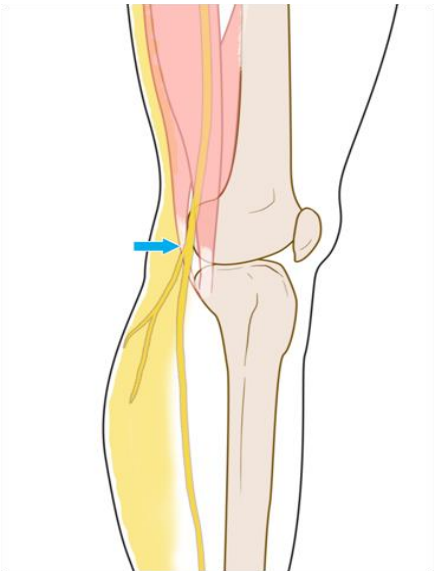

Figure 3. Photographs of the distribution of sural cutaneous nerve. arrow, branch out point of sural cutaneous nerve.

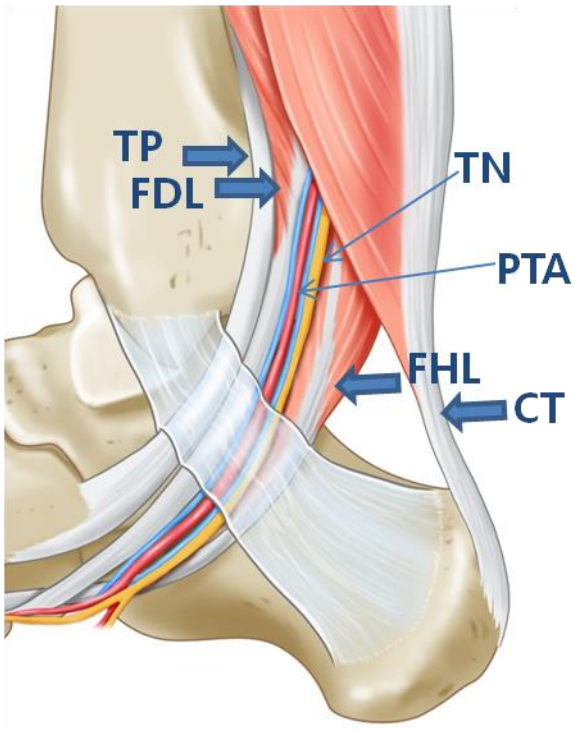

Figure 4. The structures that pass through the tarsal tunnel. TP, tibialis posterior; FDL, flexor digitorum longus; TN, tibial nerve; PTA, posterior tibial artery; FHL, flexor hallucis longus; CT, calcaneal tendon.

CONCLUSION

As a result of collecting and analyzing papers on musculoskeletal pain, and injury as conditioning methods for recovery, each method will be effective on pain region. Early treatment for pain relief is expected to strengthen training and have a positive effect on athletic performance. If further research is conducted on the effectiveness of the recovery method presented this time, it can be expected that pain prevention will not lead to injury. The limitation of this study is that it did not actually treat patients with these symptoms in clinical practice and prove the results.

APPLICABLE REMARKS

- When a dancer has a headache, it is recommended to check the tension of the suboccipital triangle, when there is back pain, check the tension of surrounding muscles such as the hamstring, and when there is pain in the ankles and plantar region, it is a good idea to check the structure passing through the tarsal tunnel as the relaxation target.

AUTHORS' CONTRIBUTIONS

Study concept and design: Hea Kyung Choi. Acquisition of data: Hea Kyung Choi. Analysis and interpretation of data: Hea Kyung Choi. Drafting the manuscript: Hea Kyung Choi. Critical revision of the manuscript for important intellectual content: Hea Kyung Choi. Statistical analysis: Hea Kyung Choi. Administrative, technical, and material support: Hea Kyung Choi. Study supervision: Hea Kyung Choi.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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