

Review of literature on the role proprioception deficits in stress urinary incontinence

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Urinary Incontinence (UI) is more common than the other chronic disease. The prevalence of UI is between 9 and 74%. Among the varied sorts of UI, Stress enuresis (SUI) is that the most prevalent (50%). Studies have shown that postural activity of the pelvic floor muscle PFMs is delayed during rapid arm movements in women with SUI and they have decreased balance ability compared to continent women. Increased activity of the PF and trunk muscles in women with SUI may impair balance as a results of a reduced contribution of trunk movement to postural correction or compromised proprioceptive acuity. The aim of this study is investigating whether the proprioception matters in SUI or not. Totally 30 articles from different databases are reviewed. Mechanoreceptors are present within the joint capsule, ligament, muscle and skin; contribute to a posh reflex system; that acts to regulate posture and coordination. Timing is known as an important function of motor coordination and it is affected by proprioception as well. Proprioception has demonstrated profound effects on timing, muscle coordination, balance and postural activities which is impaired in women with SUI. Studies claimed that Pelvic Floor Muscle (PFM) training; vibration training and electrical stimulation have positive effects on SUI by improving proprioception that results in improve muscle coordination. Not only is the strength of the Pelvic Floor Muscle (PFM) but also the timing of contraction of PFM playing an important role in maintaining continence. Further research is required to guage the proprioception of Pelvic Floor Muscle (PFM) in women with SUI as a matter of incontinence.

Introduction-

Female urinary continence is maintained through an integrated function of pelvic floor muscles (PFMs), fascial structures, nerves, supporting ligaments, and therefore the vagina. In women with SUI, the postural activity of the PFMs is delayed and therefore the balance ability is decreased. Many women, by learning the right timing of a pelvic floor contraction during a cough, are ready to eliminate consequent SUI. Timing is a crucial function of motor coordination and will be suffering from proprioception. This study was conducted to review and description the literature on proprioception as a contributory think about SUI.

The prevalence of urinary incontinence (UI) is about 38.4 in women older than 40 to 50 years in Iran , and it is more common than any other chronic disease . In addition, the prevalence of UI in women (27.6 %) is more than in men (10.5 %) . The 3 most common types of UI are as follow: stress urinary incontinence (SUI), characterized by an unintentional loss of urine occurring as a result of an increase in intraabdominal pressure due to effort or exertion or on sneezing

or coughing; urge urinary incontinence (UUI), denoting involuntary leakage arising for no apparent reason and associated with urgency; and mixed urinary incontinence (MUI), denoting the mixture of both SUI and UUI. Also, SUI is the most prevalent (50%) form of UI, with the UUI and MUI representing 11% and 36% (3% not classified), respectively SUI imposes substantial costs both on the individual and the society in the USA and worldwide . The treatment costs are estimated up to \$16 billion annually in the USA. In developed countries, aging leads to increasing the issues related to SUI. While the etiology of SUI in women seems to be multifactorial, vaginal childbirth and pelvic trauma have been shown to have major impacts on the incidence of SUI.

The possible pathophysiology aspect of the continence system leading to SUI includes the anatomical (pathologic support of the anterior vaginal wall) , functional (the intrinsic sphincter deficiency) , and neurophysiologic (neurocircuitry) of the urethral continence mechanism damage and proprioception deficiency), which may be a bridge between the anatomical and functional aspects. Understanding these mechanisms may help to achieve a comprehensive and integral theory which considers all anatomical, functional, and neurophysiological aspects .

Sherrington, by presenting the term proprioception, stated that the body acts as a stimulus for its own receptors. Proprioception communicates the sense of force, sense of effort, sense of balance, and sense of position and movement (kinesthesia) in the musculoskeletal system Receptors that involve in proprioception are located in skin, joints, and muscles. Tendon organs and muscle spindles, are the 2 main mechanoreceptive receptors. Following disuse or muscle damage, the sensitivity of Golgi tendon organs and muscle spindle decreases. The pelvic floor muscles in women with SUI are weaker than continent women. Hence, the mechanoreceptor sensitivity linked to these muscles may be influenced and result in proprioception deficiencies. This poor proprioceptive deficiency could be enhanced due to the absence of skin mechanoreceptors and visual inputs .

Methods-

A thorough review was done on 3 topics: (1) pathophysiology of SUI and factors that lead to SUI (2); postural control, balance, and motor control alterations; and (3) the role of proprioception in motor control in women with SUI. Inclusion criteria were (1) studies with explanatory or RCT design (2); trials that reported exclusive results on women with SUI; and (3) outcome measures relevant to motor control and proprioception. Studies in languages other than English were excluded from this review. PubMed was searched for human-study articles registered from 1998 to 2017. The keywords include stress urinary incontinence, pelvic floor muscles, proprioception, balance, and postural activity.

Conclusion-

Preliminary evidence has focused on anatomical or functional factors to elucidate the pathophysiology of SUI. However, progressively, the purpose of view tended toward an integrated theory which mixes both anatomical and functional factors (14). In fact, there may be many aspects of the continence mechanisms that may be damaged. Considering the timing alterations (21) and also the balance and postural deficits in women with SUI (22, 23), proprioception, as a key factor in motor control, seems to be important in SUI. The present inadequate insight of neurophysiologic aspects of SUI requires a profound measurement of proprioception in the pelvic floor area and the neurocircuitry of the continence mechanisms. There is a need for further studies on the role of proprioception in SUI and interventions that can improve proprioception .

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