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# Investigation of the causes of adolescent lumbar and shoulder-neck diseases and related mitigation approaches

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**Abstract.** With the rapid development of global economy and information technology, people's lifestyle has undergone great changes, and the prevalence of neck and shoulder pain and low back pain has also increased, and the age of onset is trending younger, which seriously affect their study and life, resulting in greater family burden. The survey shows that in recent years, the incidence of pain has increased year by year due to the high learning pressure of teenagers, playing mobile phones and computers for a long time. Teenagers' long-term incorrect sitting position, sleeping position, improper pen use and other bad living habits, mental and psychological factors may eventually induce the pain through affecting biomechanical imbalance. The author has discussed the etiology, intervention and also the prevention of general neck and shoulder pain and low back pain in order to provide more theoretical basis for the management of this pain in the future and better guide the clinic.

**Keywords:** Musculoskeletal pain, neck and shoulder pain, low back pain.

## 1. Introduction

Musculoskeletal pain (MSP) is a public health problem for both men and women at all ages, especially adolescents. Studies have shown that the prevalence of neck and shoulder pain (NSP) and low back pain (LBP) in adolescents is on the rise and worsens with age. And is closely related to poor mental state, vulnerable to psychological factors, living habits and other factors, may also be an important factor leading to adult cervical and lumbar diseases, continue to the work stage, so it is urgent to understand its potential risk factors and implement effective prevention and intervention measures. This study explored the influence and intervention strategies of adolescent patients with neck, shoulder and back pain [1].

## 2. Risk factors of the NSP

The generalized neck and shoulder pain which is the common and shared symptom of many diseases include all of the discomfort in the neck and shoulder. The development of neck and shoulder pain is due to the combined effect of multiple factors of which demographic factors, disease factors individual living habits are more common while job-related factors and psychosocial factors in the current etiology study has become a hot spot. However the etiology study should be expanded widely and deeply for

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example the joint the effect of related genes the synergistic action of the factors and the multi a rate analysis in the etiology study, all of which should be paid more attention.

### *2.1. Demographic factors*

Numerous studies have shown that women are more prone to neck and shoulder pain. The research of Fredriksson has also confirmed that women are more prone to neck and shoulder pain than men by case control study [2]. Sui'an Liang and others reported that the incidence rate of periarthritis of shoulder in women was significantly higher than men [3]. It have shown that women are a risk factor for neck and shoulder pain from both cross-sectional and longitudinal cohort studies

### *2.2. Disease factors*

Domestic scholars generally believe that neck and shoulder pain is a type of clinical manifestation , especially cervical spondylosis, shoulder periarthritis, and tissue inflammation around the neck and shoulders. Yongxi liu and others have also reported heart disease characterized by neck and shoulder pain is similar to Vogt 's [4]. According to the survey, it shows that which is also a risk factor of a history of rheumatism, heart disease, angina.

### *2.3. Individual living habits*

Personal lifestyle has a significant impact for diseases. It is the most basic requirement for preventing diseases by advocating for a healthy lifestyle. Bad Lifestyles such as smoking, excessive drinking, frequent staying up late, and lack of exercise are common risk factors for multiple diseases.

### *2.4. Job-related factors*

The main focus of research on the occurrence of neck and shoulder pain and work-related factors in which included terms of job type, work style, work related physiological factors, etc. Háles believe that specific physiological factors include frequent, repeated or sustained exertion, carring a heavy load , prolonged maintenance of a fixed position, insufficient rest time, vibration, and low-temperature environment [5].

### *2.5. Psychosocial factors*

Social psychological factors are ubiquitous and can guide in the social environment The various social factors that cause psychological stress and thus affect health The study of the impact on health began around the 1920s with the "Heart Physical medicine "mainly studies the effects of psychological and social factors on health and illness.

The role of diseases and their interrelationships, including personality psychology characteristics, emotions, stress, and life events

Skllgate believe that life events and significant changes in life are important risk factors for neck and shoulder pain [6].

Neck and shoulder pain is both a clinical syndrome, according to the definition of psychosomatic diseases in Occupational Health and Occupational Medicine should belong to the category of psychosomatic diseases. The causes of neck and shoulder pain are diverse, and it is a combination of personal, professional, socio psychological, and other factors. The result of cooperation. Therefore, in the future, the prevention of neck and shoulder pain should be "tailored to the disease", and comprehensive and targeted preventive interventions should be carried out to achieve ideal results.

## 3. Intervention of the NSP

The purpose of the neck health care is mainly to exercise the head self-weight load and neck muscle strength, so as to improve the stability of the cervical spine. During exercise, stretching the muscles may also enhance the contraction of the neck muscles. Neck exercise will not be restricted by the region, and cervical spine function can be adjusted in this way at work, study or at home. A randomized controlled study included 50 adolescent patients with shoulder and neck pain, randomly divided into two groups,

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25 cases each. The study group used neck health exercises combined with exercise intervention, and the control group used neck health exercises to intervene. VAS pain score, cervical dysfunction index, MF slope, MPF slope, MVC improvement of right upper trapezius muscle and other functional recovery were compared between two groups after intervention. The results showed that the VAS pain score was significantly decreased in both groups, with the average score of 2.80 in the study group and 3.56 in the control group ($P<0.05$). The average score of cervical spine dysfunction index was 23.05 in the study group and 31.06 in the control group ($P<0.05$). The MF slope and MPF slope of the study group were -0.06 and -0.31, respectively, which were better than those of the control group ($P<0.05$). The improvement of MVC of right superior trapezius muscle in study group was better than that in control group, and the difference was significant ($P<0.05$) [7].

## 4. Risk factors of the LBP

### *4.1. Poor posture.*

One significant pathogenic factor of adolescent lower back and shoulder-neck diseases is poor posture. Many adolescents adopt improper sitting or standing positions for prolonged periods, which places strain on the muscles, tendons, and ligaments in the lower back and shoulder area. Slouching or hunching forward while using electronic devices or engaging in study activities can lead to abnormal stress on the spine and its surrounding structures. This constant strain on the musculoskeletal system can contribute to the development of pain and discomfort in these regions.

### *4.2. Sedentary lifestyle*

Another contributing factor to adolescent lower back and shoulder-neck diseases is a sedentary lifestyle. Many adolescents nowadays lead increasingly sedentary lives, lacking sufficient physical activity and spending prolonged periods sitting. This sedentary behavior results in muscle imbalances and weakens the muscles that support the lower back and shoulder-neck areas. Insufficient movement leads to decreased blood circulation, oxygen supply, and nutrition in these regions, further exacerbating the risk of developing pain and discomfort in the shoulders, neck, and lower back.

### *4.3. Physical load*

Physical load is a risk factor for low back pain, which can cause serious consequences in adolescents. Neck pain is more influenced by psychosomatic factors, while shoulder and back pain are closely related to physical factors. However, some studies have pointed out that backpack weight is not related to the occurrence of LBP. Single-factor studies have shown that appropriate weight bearing can reduce the incidence of NSP/LBP. After multivariate analysis, the correlation between overloading and NSP disappeared, but the correlation with LBP remained. Because the travel time is often longer, the positive effects of loading may be underestimated, and excessive load and fatigue caused by too long show a significant correlation [8].

### *4.4. Mental factors*

Mental factors can cause different degree of sensitivity to pain, and good mental state can reduce the incidence of LBP. Mental factors are more likely to cause LBP than physical factors. The onset of NSP is associated with depressive states, especially in girls. Teenagers are susceptible to more negative factors in life, which mainly come from teachers, parents, classmates and themselves. Adolescents bear a great deal of mental stress, which plays a small role in the occurrence of neck, shoulder and low back pain and this also explains why the incidence of adolescents who have confidence in themselves is reduced [9].

### *4.5. Others*

Additionally, the excessive use of digital devices has emerged as a notable pathogenic factor in the development of lower back and shoulder-neck diseases among adolescents. Extended periods of looking

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down at screens create repetitive strain on the neck muscles and contribute to poor posture. This recurring stress on the cervical spine increases the risk of developing shoulder-neck diseases, such as cervical spondylosis. The widespread use of electronic devices among adolescents further compounds the impact of this pathogenic factor.

## 5. Intervention the LBP

### *5.1. Medication*

The first point is drug treatment. Taking anti-inflammatory drugs, taking injections, and applying ointments are all considered drug treatments. Drug treatment mainly aims to alleviate and target mild symptoms. After reading about the treatment of lumbar disc herniation symptoms with traditional Chinese and Western medicine, the article divided the patients into three groups: the treatment with Codonopsis pilosula and the treatment with Wushao snake centipede [10]. The patient was 60 years old and had long-term lumbar disease. He had received Western medicine treatment but did not improve. In this experiment, Eucommia ulmoides, centipede, cassia twig, and scorpion were added. After taking it continuously for 2 weeks, the pain decreased. After persisting in taking the medication for more than a month, the pain disappeared and the waist moved freely. So it can be concluded that Western medicine cannot provide a good treatment effect or solution for long-term chronic injuries. In addition, the comprehensive treatment of lumbar disc herniation with traditional Chinese medicine has many advantages: good treatment effect, simpler and more feasible than surgical treatment, less pain, low risk, and low cost. Treatment and care based on syndrome differentiation and treatment are easy for patients to accept, and their concerns are significantly reduced. Conclusion: The combination of traditional Chinese and Western medicine in the treatment of lumbar disc herniation has its own characteristics, and it should be combined with traditional Chinese and Western medicine to achieve good therapeutic effects. In the non-acute phase, it is recommended to strengthen lumbar functional exercise and build more lumbar muscle.

### *5.2. Physical therapy*

On the other hands, physical therapy is good choice, physical therapy mainly uses acupuncture and moxibustion, massage, and electrotherapy to dredge blood and remove blood stasis. In physical therapy, Chinese medicine mainly advocates acupuncture and moxibustion therapy, which can also combine acupuncture and moxibustion and massage to achieve a better effect. In acupuncture and moxibustion therapy, Chinese medicine has divided the low back pain into very detailed reasons, including not only rheumatic low back pain, cold and wet low back pain, but also damp heat low back pain, congestive low back pain, kidney deficiency low back pain, etc. The actual group suffering from low back pain is mostly characterized by deficiency and excess, especially in cases of cold dampness and congestive low back pain. Currently, there are many methods for treating low back pain, such as medication and physical therapy. The patients have different causes and treatment plans, but the effective way of speaking and acting is still acupuncture and moxibustion therapy. Different acupoints in the treatment method can have different therapeutic effects. We should choose Shenshu, Yaoyangguan, Guanyuanshu, Weizhong and Dachangshu for treatment, of which acupuncture and moxibustion at Shenshu has the effect of removing cold and dampness; Yaoyangguan is a local acupoint selection mainly used to clear local meridians and achieve pain relief; Guanyuan Shu and Dajie Shu have the effects of dispelling wind, dispersing cold, clearing collaterals, and relieving pain; The main purpose of selecting acupoints along the Wei Zhong[8] meridian is to dredge the bladder meridian qi. And in acupuncture and moxibustion, adding massage manipulation can effectively shorten the course of treatment and increase the therapeutic effect. Traditional Chinese medicine believes that there are close connections in the tissues of the human body, and diseases also have a state of mutual influence. In addition, stimulation of local inflammation can eliminate and alleviate the development of inflammation. Physical therapy still belongs to conservative treatment with minimal harm and side effects on patients, and can be very effective in

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treating mild lumbar diseases and lumbar soft tissue contusions and chronic diseases caused by different factors [11].

### *5.3. Surgical therapy*

Surgical therapy, as a treatment method that can achieve the maximum benefits in the shortest possible time, is usually targeted at patients with moderate to severe symptoms. Surgical treatment often has personalized adjustments and adopts different surgical plans according to the patient's different symptoms to achieve the best therapeutic effect. Currently, effective surgical treatment plans include but are not limited to traditional lumbar discectomy surgery methods, including posterior approach, intervertebral fenestration surgery Hemilaminectomy, total laminectomy, nucleus pulposus removal, anterior spinal approach. Which method to choose, such as nucleus pulposus removal or nucleus pulposus removal combined with intervertebral fusion surgery. This mainly depends on the condition of the lesion and the experience of the surgeon. it is currently recognized that the indications for surgery are when symptoms are severe and when 242100conservative treatment is ineffective for six to eight weeks, and there is a widespread feeling of muscle paralysis, requiring surgical treatment. Although surgical treatment can minimize and quickly alleviate symptoms, it is still necessary to pay attention to many concurrent symptoms and follow-up treatment, such as preoperative mispositioning and unfamiliar anatomical structures. After surgery, there were nerve damage, dural tear, vascular and visceral injuries [12].

## 6. The prevention of the NSP and LBP

Regular physical exercise and physical therapy are important approaches to address sedentary-related issues. Engaging in exercises that target the muscles of the shoulders, neck, and lower back can help strengthen them and improve flexibility. Physical therapy modalities like heat or cold therapy, ultrasound, and electrical stimulation can further reduce inflammation, promote healing, and provide pain relief.

Ergonomic adjustments also play a crucial role in preventing and managing these issues. Maintaining correct posture, using ergonomic chairs and desks, and positioning screens at eye level can reduce strain on these areas. Adolescents should be encouraged to adopt proper ergonomics to prevent any long-term negative consequences of sedentary behavior.

Regular breaks and movement are essential in alleviating discomfort caused by prolonged sitting. Short breaks that involve stretching exercises or walking can relieve muscle tension, improve blood flow, and reduce the risk of developing musculoskeletal disorders. Incorporating furniture and equipment that promote dynamic sitting or active movement can also be beneficial.

## 7. Conclusion

NSP and LBP of adolescents is a very common life problem, especially more and more children use electronic products and sit for a long time to study, we must actively face these pain, early intervention, early prevention, do not let the existence of pain seriously affect their normal life, otherwise it will lead to serious complications. At the same time, it is necessary to strengthen the prevention of risk factors and reduce the occurrence of pain. Clinically, it is necessary to further increase evidence-based research, so that more adolescents are aware of this serious problem and pay more attention to it psychologically. At the same time, parents should also pay more attention to their children and find problems in time. So that teenagers may grow up more healthily.

## References

[1] Ben Ayed H, Yaich S, Trigui M, Ben Hmida M, Ben Jemaa M, Ammar A, Jedidi J, Karray R, Feki H, Mejdoub Y, Kassis M, Damak J. Prevalence, Risk Factors and Outcomes of Neck, Shoulders and Low-Back Pain in Secondary-School Children. J Res Health Sci. 2019 Mar 26;19(1):e00440.

DOI: 10.54254/2753-8818/27/20240690

[2] Fred riksson K, Alfredsson I, Ahlberg G,et al, Work enviroment and neck and shoulder pain the influence of exposure time Results from a population based case-control study [J]. occup Environ Med ,2002, 59(3): 182-188

[3] Liang Suian, Chang Zongru, Guo Aixin, et al. Epidemiological sampling survey report of neck and shoulder pain [J].Traditional Chinese Medicine Orthopedics, 1992 4 ( 4 ) : 25-26

[4] Liu Yongxi, Shang Lilin, Zheng Gangfeng, misdiagnosis analysis of 4 cases of heart disease with neck and shoulder pain as prominent symptoms [J].Chinese Journal of Rural Medicine, 2002,9 ( 6 ) : 44.

[5] HalesTR, Bemard BP. Epidemiology of work -related muscub skeletal disorder[J]. Orthop Clin North Am, 1996, 27 (4) : 679-709

[6] Skillgake E, V ingard E, Josephson M, et al. Life events and the risk of low back and neck/shoulder pain of the kind people are seeking care for results from the Music-norrte lje case-control study [J] Epidemiol Community Health 2007,61 ( 4): 356-361

[7] Li Zhuping. The effect of neck exercise combined with exercise intervention on the improvement of neck and shoulder pain and functional recovery in adolescents [J].Inner Mongolia Traditional Chinese Medicine 2020,39 ( 6 ), 96-98.

[8] Effects of physical factors such as Deng Guoying, Zhang Yongxing and Cai Haifeng on neck, shoulder, low back pain in adolescents [J]. Chinese Medical Journal, 2014 (43) : 5.

[9] Zhang Yongxing, Deng Guoying, Zhao Sheng, etc. Effects of non-physical factors on neck, shoulder, low back pain in adolescents [J]. Chin J Medical Journal, 2014 37) : 6

[10] Shao Jisheng. Analysis of Chinese and Western medicine treatment of lumbar disc herniation [J]. Psychologist, 2019,25 ( 002 ) : 175.

[11] Xie Yiyan. Clinical research progress of traditional Chinese medicine in the treatment of lumbar disc herniation [J]. Physicians online, 2021,9.

[12] Zhou Chuanhua. Surgical treatment of lumbar disc herniation [J]. Medical Information ( Surgical Volume ), 2008.