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Retraction

Retracted: Application of Composite Nano-Bone Transplantation and Massage Exercise Rehabilitation Training in Patients Undergoing Limb Replantation

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Tang and J. Fu, "Application of Composite Nano-Bone Transplantation and Massage Exercise Rehabilitation Training in Patients Undergoing Limb Replantation," *Advances in Materials Science and Engineering*, vol. 2022, Article ID 2065744, 8 pages, 2022.

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Research Article

Application of Composite Nano-Bone Transplantation and Massage Exercise Rehabilitation Training in Patients Undergoing Limb Replantation

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With the great stride forward of socialist progress, various medical treatment measures have also made a leap forward in development, providing a deeper guarantee for people's life safety. At the same time, the research field of nanotechnology has gradually developed in the medical field, which plays an important role in the development of medicine, and massage exercise rehabilitation training also provides convenience for patients' recuperation. The purpose of this study is to study the application of composite NanoBone transplantation in patients with limb replantation and the application of massage exercise rehabilitation training in patients with limb replantation. The methods used in this paper are: consulting the literature to understand the composite NanoBone transplantation technology and massage exercise rehabilitation training methods, interviewing the patients and attending doctors, and asking about the selection method of experiment and questionnaire used in the paper, so as to carry out the questionnaire survey. The treatment group and the control group were set up to analyze the results. The results showed that there were no significant differences in T lymphocyte subsets, serum complement, and circulating immune complex in the replantation of amputated limbs. Combined with the clinical manifestations and pathological results, early rejection occurred, and the body temperature of the patients increased after clinical treatment; The characteristics of massage are not practical, the course of treatment is short, the effect is fast, the clinical operation is simple, easy to grasp, and has high clinical application and promotion value. The final test results showed that: comparing the two groups of patients before treatment, the VAS scores were 23% and 21%, respectively, and the treatment group scores were 23% and 21%, respectively. After treatment, the VAS scores of the test group and the control group were 29 % and 27%, respectively. The treatment group scored 2% higher than the control group. From this, it can be concluded that massage is better than traditional massage, and massage exercise has great application prospects in clinical practice.

1. Introduction

With the development of the economy, trauma, tumor, infection, and other diseases caused by traffic, construction, environment, and other reasons are increasing year by year. The incidence of nonunions and bone defects has also increased from 3.7% in 2008 to 5.6% in 2021 increased by nearly 1% [1]. In the past, autogenous bone grafting and allogeneic bone [2] grafting were the main methods to treat bone nonunion and bone defects. The former has a limited bone mass in the donor site, prolonged operation time, increased intraoperative blood loss, and complications such as pain, infection, and loss of function; the latter has been widely used with the continuous improvement of bone bank processing technology, but there are risks of rejection and disease transmission. Therefore, people have carried out the search for low-risk, high-efficiency, easy-to-use, plastic bone transplantation research. Since the 1980s, bone tissue engineering has been developed on the basis of interdisciplinary research in engineering, cell biology, materials science, and medicine. Bone tissue engineering refers to the separation of autologous high-concentration osteoblasts,

bone marrow stromal stem cells, or chondrocytes, which are cultured and expanded in vitro and then planted in a natural or artificial synthetic material with good biocompatibility. The research of tissue-engineered new bone tissue is a branch of tissue engineering research, which provides a new platform for the study of ideal bone transplantation. In recent years, more and more scaffold materials have been used in clinical research. According to the different sources of materials, they can be generally divided into three categories: organic polymer materials, inorganic materials, and composite materials [3]. Organic polymer materials have the advantages of large-scale production, structural design and control, mechanical strength, and degradation time, but lack cell signal; inorganic materials have good biocompatibility and cell recognition signals, which are conducive to cell adhesion and proliferation, but the disadvantage is poor mechanical strength and rapid degradation in vivo. At present, no material has been found to be able to achieve or approach the performance of the ideal scaffold material. The characteristic of composite materials is to combine two or more different materials in a certain proportion, learn from each other, make up for each other, and give full play to maximum efficiency.

Massage is based on the theory of viscera and meridians of traditional Chinese medicine, combined with the anatomy and pathological diagnosis of Western medicine, and uses manipulation to act on specific parts of the human body to adjust the physiological and pathological conditions of the body and achieve the purpose of physiotherapy. Say, it's a physical therapy. Massage has the effects of dredging collaterals, promoting blood circulation and removing blood stasis, removing dampness, dispelling cold, detumescence and pain relief, making the back blood unobstructed and veins unblocked; Symptomatically, it is completely similar to thoracodorsal or lumbosacral fibrositis, although its mechanism is another cause, more common in workers in wet and cold conditions; it is often difficult to distinguish clinically unless, according to the characteristics of medical history, targeted lumbar muscle exercise can enhance the muscle strength and toughness of a lumbar muscle, not only can assist the treatment of lumbar muscle strain but also can consolidate the curative effect and prevent the occurrence of lumbar muscle strain. It is an effective and safe method to recover the back muscle through massage. At the same time, massage therapy combined with exercise waist muscle strain treatment, significantly affect the symptoms and signs of patients, and it is a rapid and effective relief of local acute and chronic inflammation, relieve spasm, release adhesion, etc., effectively prevent the adhesion of lumbar back muscles and soft tissue. Exercise can enhance the strength of the lumbar muscle, enhance the stability of the lumbar muscle, not only consolidate the therapeutic effect but also effectively prevent the recurrence of lumbar muscle strain, and finally completely cure lumbar muscle strain. A long-term reasonable and appropriate amount of physical exercise is very important for the treatment, recovery, and prevention of lumbar muscle strain, and more important for human health [4]. In patients with complete recovery, correct exercise can effectively prevent the recurrence of lumbar muscle strain. In the feedback of patients, we found that if patients take exercise prescription for muscle rehabilitation exercise, after 1–2 courses of massage therapy and rehabilitation exercise, most of them can be cured within a month, and the symptoms and signs of patients will gradually disappear, and finally fully recover. Compared with traditional Chinese and Western medicine, massage therapy combined with rehabilitation exercise has a significant effect on lumbar muscle strain. Patients can be treated not only in a hospital but also at home according to exercise prescription, which is convenient, economical, and feasible.

In recent years, with the research on the clinical application and clinical observation of composite NanoBone transplantation [5], it is found that the incidence of complications can be greatly reduced and the survival rate and recovery function of amputated limbs can be improved after replantation of defective limbs. Using medical means to restore the shape and function of limbs has been the goal of medical experts since ancient times, and it is also the common hope of mankind all over the world. However, regeneration after amputation seems to exist only in science fiction. In the 1960s, due to the backward development of science and technology, surgeons could only use a self-made simple magnifying glass, which greatly reduced the probability of vascular anastomosis, greatly increased the probability of late vascular embolism, and the survival rate of the stump was very low, only less than 50%. In the 1970s, with the further development of microsurgery and other new technologies, microvascular anastomosis became possible, which greatly improved the survival rate of amputees and brought good news to the majority of patients. However, the occurrence of postoperative complications greatly affects the function or activity of the amputated limb. Usually, after the amputated limb survives, it only has a complete appearance and loses its function, which makes the replantation of the amputated limb into a difficult situation. In the 1980s, with the further development of advanced technology, much advanced science and technology were applied to the medical field. In addition, with the increase in doctors' clinical experience, the survival rate of replantation of amputated limbs is further improved. However, when the amputated limb survived, the functional recovery of the amputated limb did not achieve the expected effect. Today, with the exploration and efforts of generations of orthopedic experts, vacuum sealing drainage technology has been applied in the orthopedic clinic. It not only has obvious advantages in improving the survival rate of amputated limb replantation [6] but also has a significant effect on improving the functional recovery after replantation.

In the process of bone regeneration, the ideal scaffold should have sufficient nutrition and appropriate mechanical properties, which can simulate the natural microenvironment of bone defects and support the proliferation and differentiation of specific cells. Bone graft regeneration [7] must have high mechanical properties, including appropriate mechanical strength and toughness, providing sufficient mechanical strength and stiffness to replace the lost bone, bearing the load bone replacement, supporting the proliferation and differentiation of osteoblasts, and the

expression of bone matrix protein. Lumbar muscle strain is a common and frequently occurring disease, which seriously endangers human health. A long course of the disease, difficult to cure and recurrent attacks, seriously affect the patient's life, work, study, and physical and mental health. In the face of the growing trend of lumbar muscle strain, many scholars have updated the treatment methods and means in practice, from simple to comprehensive, from medicine to manipulation, from acupuncture to physical therapy, and so on. There are a variety of treatment methods, different treatment effects, poor efficacy, and easy to relapse, especially the follow-up observation and follow-up visit after treatment are almost blank. According to the clinical manifestations, pathogenesis, characteristics, and pathological mechanism of lumbar muscle strain, massage combined with exercise is a treatment method without side effects, quick effect, obvious recovery of lumbar muscle function, and no recurrence. Massage combined with exercise is a feasible and effective method to treat lumbar muscle strain and to achieve the goal of treatment, rehabilitation, and prevention. This paper is to study the application of composite NanoBone transplantation in patients with limb replantation and the application of massage exercise rehabilitation training in patients with limb replantation. The innovation of this paper is: through the study of the clinical manifestations, pathogenesis, characteristics and pathological mechanism of lumbar muscle strain, a new treatment plan for the treatment of lumbar muscle function recovery with fast recovery, no side effects, and no recurrence is concluded. Tuina plus exercise is a practical and effective treatment and to achieve the purpose of treatment, recovery, prevention, and so on.

2. Application of Composite NanoBone Graft in Patients with Limb Replantation

2.1. Introduction to Composite Nano. A nanometer (NM) [8] is a unit of length. One nanometer is one billionth of a meter and one thousandth of a micron, about 10 atoms long. Suppose the diameter of a hair is 0.05 mm. Cut into 50000 pieces along the radial direction, and the thickness of each hair is about 1 nm. The so-called nanotechnology is a new technology to study the motion laws and characteristics of electrons, atoms, and molecules in the range of 0.1~100 nm. Several dozens of countable atoms or molecules exhibit many new characteristics at the nanoscale. This kind of material has special properties, which is different from the original atoms and molecules as well as macroscopic materials [9]. The technology of using these characteristics to make devices with specific functions is called nanotechnology. Nanotechnology is an interdisciplinary and comprehensive subject. In 1993, the international nanotechnology Steering Committee divided nanotechnology into six branches nanoelectronics, nanophysics, nanochemistry, nanobiology, nanoprocessing, and nanometrology.

The current research and application of nanotechnology are mainly in materials and preparation, microelectronics and computer technology, medicine and health, aerospace and aviation, environment and energy, biotechnology, and agricultural products. Nanomedicine [10] is a "science and technology that uses molecular equipment and human molecular knowledge to diagnose, treat and prevent diseases and trauma, relieve pain, and promote and maintain health." Nanobiomedicine is to extract essential substances from plants and animals and then combines them at the nanoscale to achieve maximum efficacy. This is one of the most potential areas for development after China's accession to the WTO. At present, the international pharmaceutical industry is facing a new choice, that is, to develop the nanopharmaceutical industry.

Nanocomposites [11] are based on resin, rubber, ceramics, and metal matrix as the continuous phase, nanosize metal, semiconductor, rigid particles, and other inorganic particles, fiber, carbon nanotubes, and others modified into dispersed phase. Through the appropriate preparation method, the modifier is evenly dispersed in the matrix material to form a composite system containing nanomaterials, which is called nanocomposite materials. Composite materials have been widely used in aerospace, national defense, transportation, sports, and other fields because of their excellent comprehensive properties, especially the designability of performance. Nanocomposites are the most attractive part. In recent years, the development of new materials in developed countries put the development of nanocomposites in an important position. The research directions include nanopolymer matrix composites, carbon nanotube functional composites, and tungsten copper nanocomposites.

2.2. Bone Transplantation. Bone transplantation refers to the removal of bone of appropriate size from other parts of the patient's body or the removal of the donor's bone from the bone bank and transplantation to the bone defect. Bone transplantation has been widely used, but donor bone cells cannot survive in the recipient unless autologous transplantation. However, the remaining death matrix has the ability to induce bone, which can stimulate the host osteoblasts to recombine in the matrix to produce new bone. Therefore, the scaffold of bone graft is building a bridge and can stabilize the defective bone until a new bone is formed. Cryopreservation of allogeneic cadavers can reduce the immunogenicity of bone and the feasibility of maintaining chondrocytes [12]. Immunosuppressive agents were not used after transplantation. Although these patients can produce HLA antibodies, they can also produce HLA antibodies to prevent cartilage injury in the early stage. The recognition function of HLA actually refers to the unique synergy in the immune response. Antibodies are produced by B cells, but in most cases, macrophages and T lymphocytes are required.

3. Application of Massage Exercise Rehabilitation Training in Patients with Replantation of Amputated Limbs

3.1. Massage Sports Rehabilitation Training. Tuina techniques originate from the initial instinctive actions of human beings, such as friction for warmth, stroking pain, stroking

between mothers and infants, and mutual touching between human bodies. The code name and basic technique of the oracle bone inscriptions are "把." The "Yin Shu" unearthed from the early Han tombs in Zhangjiashan, Jiangling included "foot tarsi," "shaking fingers" and other techniques, and recorded the intraoral reduction method of subluxation of the temporomandibular joint. "Fifty-two disease prescriptions" contained There are more than 10 kinds of techniques such as pressing, massaging, scratching and scraping, and there are pressing methods to stop bleeding, medical towel massage and so on. The classification of massage techniques is rubbing, rubbing, pushing, wiping, and sweeping. Massage: massage is the oldest external treatment of traditional Chinese medicine in China. In ancient times, massage was called "pressure" or "case." China's first monograph on traditional massage is "Huangdi Qibo massage ten volumes" in Qin and Han Dynasties. This book mainly demonstrates that massage is a traditional Chinese medicine therapy based on Yin and Yang, five elements, viscera and meridians, Qi, blood, and body fluid. Massage is one of the earliest physical therapies in human history [13]. It can promote human blood circulation, dredge meridians, regulate human metabolic function and prevent diseases by pinching, pressing, pressing, rubbing, point, rolling, picking, and other operations on the human body, as well as different transformation technologies and different parts of the operation. Modern massage is a kind of rehabilitation therapy based on the theory of channels and viscera of traditional medicine and combined with anatomical characteristics [14]. It is divided into medical massage, health massage, and sports massage. Massage is simple and easy to learn, and it can also replace medicine to treat some diseases. At present, massage therapy [15] is widely used: five sense organs, internal medicine, trauma department, pediatrics, gynecology, and other departments have use massage therapy or auxiliary treatment, especially for the treatment of some chronic diseases and functional diseases with unique therapeutic effects.

Sports: sports were a kind of social activity in which people take physical exercise and exercise as the basic means to enhance their physique and health. In the process of exercise, the structure of the body will change with the movement, so as to promote the metabolism of the human body and enhance its own physique. Sport is an indispensable way of life for human beings [16]. People follow the law of human growth and development and sports activities. Through purposeful exercise, people can achieve the purpose of strengthening their physique, improving physical and mental functions, promoting health recovery or creating conditions for surgical preparation, and reducing or avoiding postoperative complications. Exercise can make "eliminate all kinds of diseases, strengthen the body, prolong life, eyesight is light and healthy, no longer tired." The training time is 30 minutes at a time, three times a day. As early as the spring and autumn period and the Warring States period, people used guiding technology to prevent and treat diseases [17]. Later, Wuqinxi, Taijiquan, and Baduanjin were used as exercise methods to keep fit and eliminate diseases. The movement they were engaged in at that time became an effective means for the ancient working people to prevent and cure diseases. Modern medical research and clinical observation data show that in the process of patients' rehabilitation treatment, various exercise methods in ancient China, such as traditional guidance, Wuqinxi, Taijiquan, gymnastics, and running, can make patients have confidence in life, relieve the initial symptoms, and have a better auxiliary treatment effect. At present, exercise has become one of the most important methods to treat diseases.

Massage therapy is one of the main methods to treat lumbar disc herniation in China. Massage can effectively relieve muscle tension, change local abnormal muscle tension, and play a role in relaxing the muscle. Through different manipulation, it can also improve local blood circulation and promote local metabolism, so as to achieve the purpose of treating lumbar disc herniation.

3.2. Research Methods

3.2.1. Sample Library. There were 80 inpatients in Hospital *D* from May 2015 to March 2016. The clinical diagnosis and surgical indications were clear. A bone graft is required during the surgery. The patients and their families agreed to participate in the clinical trial. The patients who did not meet the inclusion criteria were excluded, and 60 of them were selected for this experiment, and the questionnaires were analyzed after the experiment. The patients with replantation of amputated limbs were divided into three categories based on their initial symptoms. The three categories are mild, moderate, and severe. The questionnaire adopts the method of "stratified sampling," and random sampling is carried out according to two levels of mild and moderate personnel, severe patients and patients who have not undergone composite NanoBone transplantation and massage exercise rehabilitation training. The number of personnel samples is 30, accounting for 50% of the total number of middle and senior management personnel; the number of mild personnel and patients without composite NanoBone transplantation and massage exercise rehabilitation training is 15, accounting for 25% of the total number of grass-roots management personnel and general personnel; the number of critically ill persons is 15, accounting for 25%. The investigators did not include patients who were excluded from the experimental criteria.

3.2.2. Specific Implementation Process. In order to further verify the effect of the one-year operation of the application of composite NanoBone transplantation and massage exercise rehabilitation training in patients with severed limb replantation, a questionnaire survey was conducted twice before and after the operation. And the surveyed persons are selected by random number generator software. By visiting the recovery of nurses and patients, a three-person investigation team was formed to refine the division of responsibilities. According to the division of labor, they went to various departments to find the corresponding respondents, distributed a total of 330 questionnaires and informed the specific time of collection. Finally, 330 questionnaires were

Table 1: Observation of clinical signs.

	Group 1	Group 2	Group 3
Temperature	Increase, less than 38 degrees°	It was higher than 38°, in 3 cases	It was higher than 38°, in 8 cases
Wound response	Good	3 cases had a local reaction	5 cases had a local reaction
Wound healing	All grade A	Two cases were grade B	Three cases were grade B

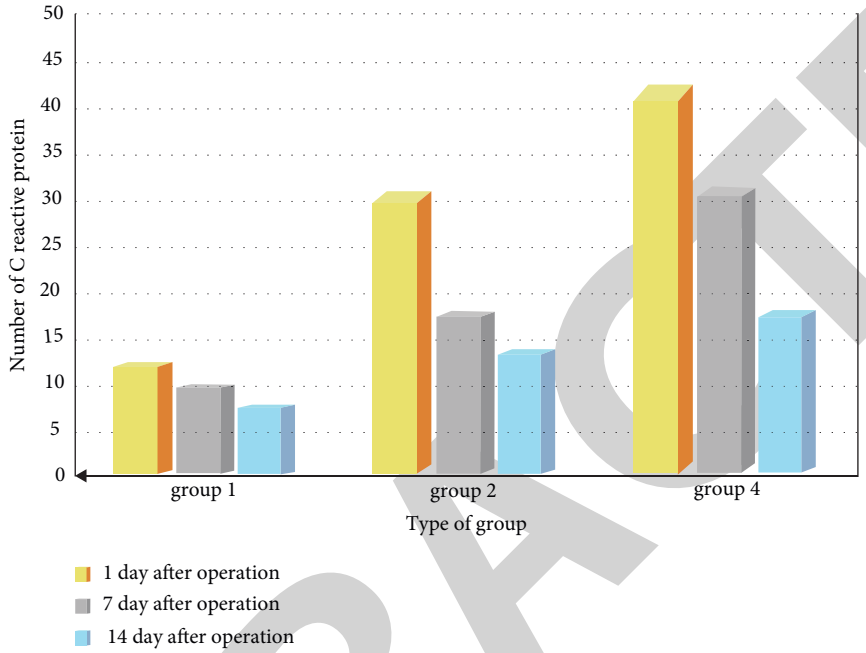

Figure 1: Changes in reactive protein after an operation.

collected on schedule, the validity was judged, and the effective questionnaires were statistically summarized. If the operation time is long, the breathing gas and intravenous infusion should be warmed, and even the abdominal cavity and the thoracic cavity should be washed during the operation, and the washing liquid should be warmed. If it is not heated, a basin of water will be poured in and pressed down, and the heart will run up. This is a stress response, and the complications of the incision will increase.

3.2.3. Statistical Analysis Methods. According to questions 1–8 of the questionnaire, the basic situation of the surveyed personnel will be classified and counted. One question and one option will be counted once for each person. In the end, 50 middle-level personnel will have 800 options for questions 1–16 to evaluate the recovery after surgery, and 25 people will appear. There were 4,480 options for mild personnel and patients who did not undergo composite NanoBone grafting and massage exercise rehabilitation training.

4. Results and Discussion

4.1. Application of Composite NanoBone Graft in Patients Undergoing Limb Replantation. The clinical signs were observed:

Shown as in Table 1, the body temperature of the three groups increased, and the temperature of the second and third groups was higher than 38 degrees; the wound response of the first group was good, while that of the second and third groups was local reaction; the wound healing state of the first group was grade A, and that of the second and third groups was grade B.

Shown as in Figure 1, the level of C-reactive protein in the three groups continued to rise, while that in the third group increased significantly. One day after the operation, the number of C-reactive proteins in the three groups were 12, 31, and 43, respectively; on the seventh day after the operation, the number of C-reactive proteins in the three groups was 10, 18, and 32, respectively; two weeks after the operation, the number of C-reactive protein in the three groups was 8, 14 and 18, respectively. Early rejection was confirmed by pathology.

Shown as in Figure 2, there was no significant difference in T lymphocyte subsets, serum complement, and circulating immune complex in group 4, but it was significantly higher than the average value in group 123. Before the operation, the X2 of T lymphocyte subsets, serum complement, and circulating immune complex were 52, 34, and 29, respectively; the X2 of T lymphocyte subsets, serum complement, and circulating immune complex were 53, 39, and 30, respectively, on the third day after the operation; and the X2 of T lymphocyte subsets, serum complement and

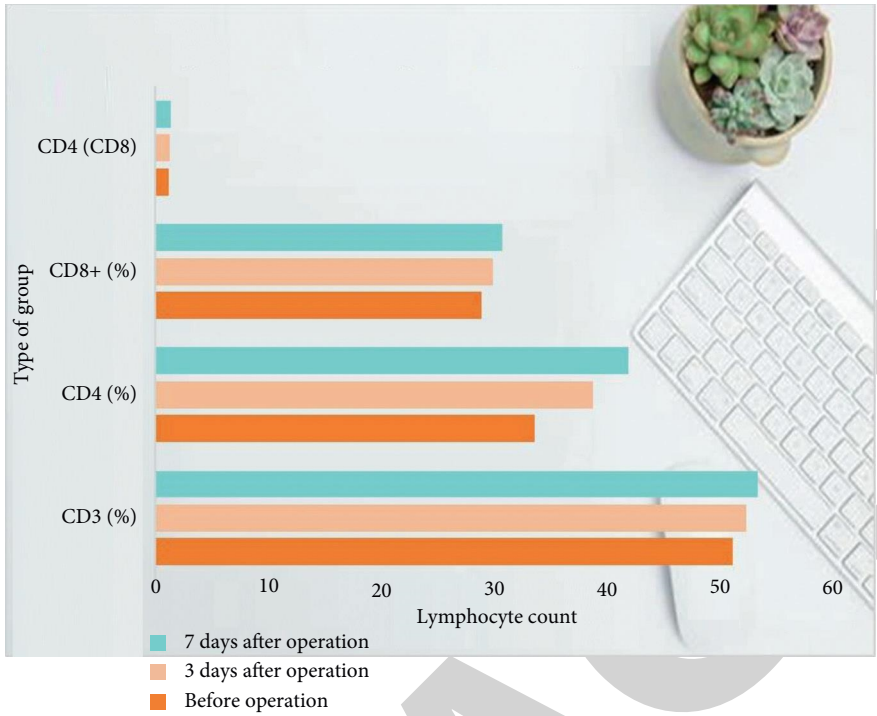

Figure 2: The changes of T lymphocyte before and after bone graft.

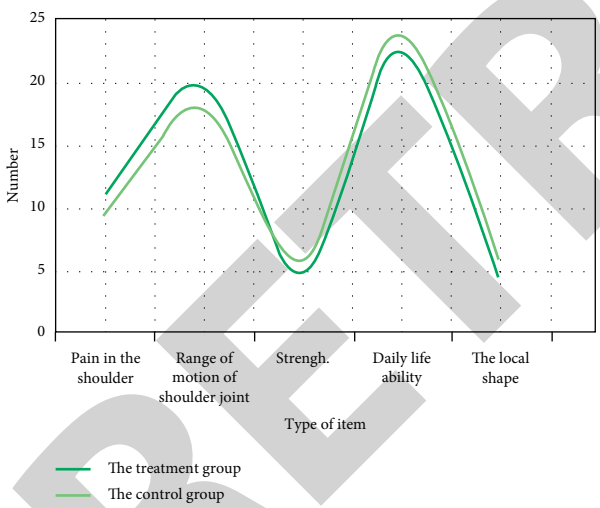

Figure 3: Comparison of clinical symptoms and evaluation scores between the two groups before treatment.

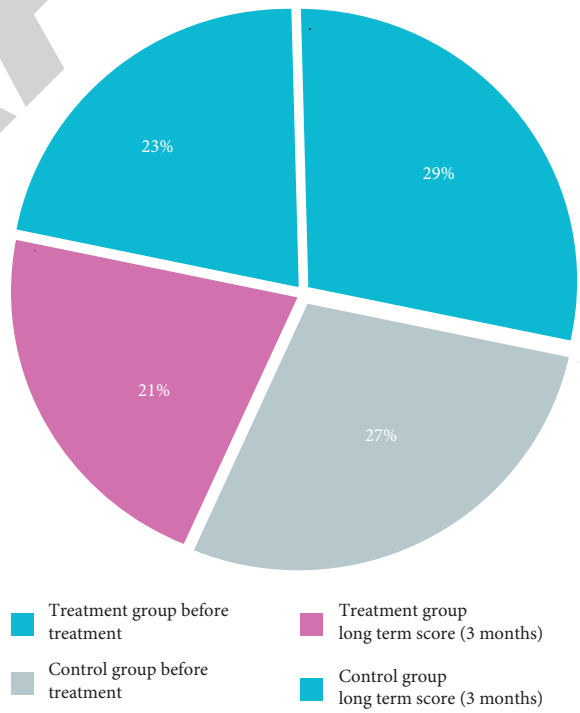

Figure 4: Comparison of visual pain scores between the two groups.

circulating immune complex on the third day after operation were 53, 39, and 30, respectively. Combined with clinical manifestations and pathological results, early rejection occurred.

4.2. Application Research Results of Massage Exercise Rehabilitation Training in Patients with Limb Replantation. Before treatment, the clinical symptoms and evaluation scores of the two groups were compared.

Shown as in Figure 3, there was no significant difference in clinical symptom scores (shoulder pain, shoulder joint range of motion, muscle strength, activities of daily living, and local morphology) in the treatment group and the control group (shoulder pain, shoulder joint activity, muscle strength, activities of daily living, local morphology) before treatment.

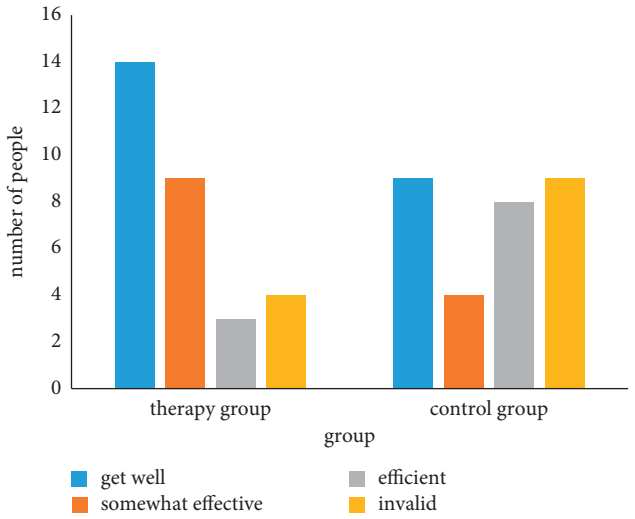

Figure 5: Histogram one and a half years after treatment.

The visual pain scores of the two groups were compared.

Shown as in Figure 4, the VAS scores of the two groups before treatment were compared: the score of the treatment group was 23%, the score of the control group was 21%, and the score of the treatment group was 2% higher than that of the control group; the VAS score of the treatment group was 29%, the score of the control group was 27%, and the score of the treatment group was 2% higher than that of the control group. Therefore, we can draw a conclusion that massage is better than conventional massage, massage exercise has a certain value, and should be widely used for clinical treatment.

The histogram one and a half years after treatment is shown in Figure 5.

According to the composite NanoBone graft and the comparative experiment of the two groups of patients in the replantation of severed limbs, the efficacy evaluation showed that the overall excellent rate of the treatment group was 85%, and that of the control group was 70%. The survival rate and overall excellent rate of the treatment group were significantly higher than those of the control group.

5. Conclusion

The composite of carbon nanotubes with inorganic materials, natural biodegradable polymer materials, and synthetic degradable polymer materials can be used to construct composite bone tissue engineering scaffolds by forming particle pores, thermally induced phase separation, microsphere aggregation, electrospinning, and three-dimensional printing. Carbon nanoscaffolds have significant effects on cell proliferation and bone regeneration. There was no significant difference in T lymphocyte subsets, serum complement, and circulating immune complex in the replantation of amputated limbs. Clinical observation and pathological examination showed that the patient had an early rejection in clinical and had a higher body temperature. The first group had a better response, and the second and third groups had obvious local responses. The first group is type A, and the second and third groups are type B. Massage and massage can be effective in relieving pain, ability to live, shoulder function, and mobility in amputees. The characteristics of massage therapy are that it is not practical, the course of treatment is short, the effect is quick, the clinical operation is simple, and it is easy to master. It has a high clinical application and promotion value. This study is only to study the application of composite nanocomposite transplantation and massage rehabilitation training in patients receiving limb replantation. Although the experimental part is very detailed, it is not authoritative and the experimental sample is not large enough.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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