

## *Fat grafting Bone spurs*

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### Abstract

*Pain caused by bone spurs is one of the most common diseases around the world. To date, there is no permanent cure for thorn pain. Therefore, after studying the characteristics of the foot and the fork inside the foot, we concluded that it is possible to suction the fat from the patient's body around the navel and surround the bone thorn with this fat to form an insulating layer between the thorn and the layers of the foot. Thus, the patient does not feel it and can live with it without pain. There is a need to use the fat stored under the skin. It is a mixture of brown, beige and white fat cells. The majority of our body fat is under the skin. The treatment is divided into two procedures: liposuction and then injecting it around the fork during liposuction. During liposuction, a plastic surgeon delicately removes excess fat through a small, hollow tube called a cannula. The drawn fat is injected into the heel layers to relax the tendon.*

- **ملخص:**

### **نطعيم الدهون للعظام**

*يعد الألم الناتج عن الشوكة العظمية أحد أكثر الأمراض شيوعاً حول العالم. حتى الآن ، لا يوجد علاج دائم لألم للشوكة العظمية. لذلك وبعد دراسة خصائص القدم والشوكة داخل القدم وصلنا إلى أنه من الممكن شفط الدهون من جسم المريض حول السرة وإحاطة الشوكة العظمية بهذه الدهون لتشكل طبقة عازلة بين الشوكة و طبقات القدم. وبالتالي لا يشعر بها المريض ويمكن أن يتعايش معها دون ألم. وهذا ناتج عن ربط مجال العظام بمجال التجميل.*

- **Purpose**

*Foot infections are considered chronic diseases that can be treated for a long time, which is the emergence of what is known as the "thorn of the*

foot", and it causes great suffering to humans. . It appears in men and women and may appear in some children, but it is found in abundance in women. Inflammation occurs in the area where the membrane meets the bone of the foot as a result of calcium deposits in it leading to the formation of bony spurs, or as it is called plantar fasciitis, which is the most common cause of heel pain. The plantar fascia is a flat band of tissue (ligaments) that connects the heel bone to your toes and supports the arch of the foot. Fork of the foot is known as a common disease that affects women, especially after the age of fifty. One of the symptoms of the disease is that it causes severe pain on the lower surface of the hock and heel area when standing or walking, especially in the early morning or after rest periods.

• **Background research:**

Osteoarthritis pain is one of the most common diseases around the world. To date, there is no permanent cure for thorn pain. Therefore, after studying the characteristics of the foot and the thorn inside the foot, we concluded that it is possible to suction the fat from the patient's body around the navel and surround the bone thorn with this fat to form an insulating layer between the thorn and the navel. foot layers. Thus, the patient does not feel it and can live with it without pain. There is a need to use the fat stored under the skin. The treatment is divided into two procedures: liposuction and then injecting it around the fork during liposuction. One of the most important additions is that it will be a permanent solution and permanently remove bone thorn pain



Figure 1

□

## • Hypothesis

The viscosity and density of adipose tissue have a significant impact on fat retention.

The 2.5 mm-diameter cannulas had significantly lower inlet pressure and maximum velocity.

The larger cannula has lower inlet pressure and maximum speed during liposuction, which further affects the viability of fat cells and fat stem cells.

Tendons are thick, fibrous cords that attach muscles to bones and help them move, although any tendon in the body may become infected with this inflammation, which results in a lot of pain, for example, the bone spur.

Our hypothesis is that when fat is added to surround the bone spur, the fat works to relax the tendon, so no pain is felt for the bone spur.

## • Variables

One of the most important variables that can occur in our project depends on the health of the patient

Because perhaps when one of the patients has (diabetes) it will have a negative impact on the success of the project, so we choose some patients that we will exclude:

1) Exclusion of diabetics      2) Exclusion of heavyweight (BMI: obesity 30 to 34.9 and severe (obesity: more than 35)

3) Exclusion of patients with scabies in the skin, psoriasis, and those taking anti-diabetic drugs

So we choose: The test is selected for patients by prickly pain sufferers of all age groups in various ethnicities.

The second variable is: the procedures followed in the event of complications or side effects during the research procedure. Which will affect the project depending on the patient's behavior after fat injection in the foot.

The patient is advised to rest completely until the period of time when the fat takes its normal position with the underlying tissues immediately

after the injection, because perhaps when the patient presses on the fat injection site, which leads to the killing of stem cells

### • procedure

The orthopedic field is linked to the field of the plastic surgery specialist, by suctioning the excess fat in the human body and injecting it into the heel of the patient suffering from plantar fascia pain, so that the fat surrounds the inflamed plantar fascia (bone thorn).

Before the operation is performed, the patient's health condition must be checked to notice the difference before and after the experiment

The fat in the patient's body should be examined to ensure that it is free of diseases so as not to cause problems or side effects.

### • -Criteria for selecting participants:

1. Exclusion of diabetics
2. Exclude heavyweights (body mass index: obese from 30 to 34.9 and extremely (obese: more than 35).)
3. Exclusion of patients with scabies in the skin, psoriasis, and those taking anti-diabetic drugs

The test for patients is chosen according to who suffers from thorn pain of all age groups in different races

The experiment is divided into two parts:

the first incision is liposuction and the second incision is re-injection and the fat surrounding the bone spur.

1. A board-certified plastic surgeon delicately and accurately removes excess fat through a small hollow tube called a cannula.

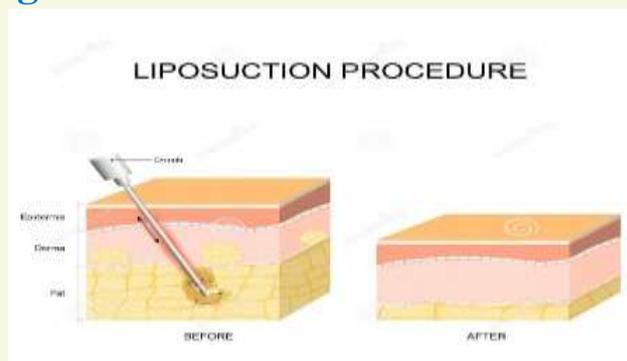


Figure 4

2. The extracted fat is added and we will insert

3. this fat is next to the bone spurs.

### • Data

No.	Who gets bone spurs?
1)	Those who stand for long periods of time.
2)	Overweight.
3)	Walking without shoes for long periods.
4)	Wearing uncomfortable shoes such as these with high heels usually affects women more than men.



No.	Previous solutions	Weaknesses of previous solutions
1)	<b>massage therapy</b>  figure 5	Not a permanent solution
2)	<b>Stretching</b>  figure 6	Not a permanent solution
3)	<b>Weight loss</b>  figure 7	Depending on the behavior of the patient
4)	<b>cortisone injections</b>  figure 8	High blood sugar and pressure in the body causes changes in skin color
5)	<b>PRP injection</b>  figure 9	Contamination during injection due to lack of complete sterilization
6)	<b>Hyaluronic acid injection</b>  figure 10	Its price is expensive

	Using fat to surround the bone spur
<b>Benefits</b>	<ol style="list-style-type: none"> <li>1) Removing the pain caused by the bone thorn</li> <li>2) The use of fat to repair damaged tissues due to calcium deposition in the foot.</li> <li>3) Using fat as an insulating cushion between the thorn and the nerves that transmit pain and help relax the tendon between the heel and the toes.</li> </ol>
<b>Risks / Side Effects</b>	<ol style="list-style-type: none"> <li>1) Swelling in the injured heel as a result of the excess injection for a period of two to three months.</li> <li>2) Contamination is possible, but considering complete sterilization methods, this percentage will be reduced to a minimum</li> <li>3) Under direct pressure after injection, the stem cells in the injected fat may die.</li> </ol>

## • Results

### -the potential benefits (direct & indirect)

1. Removing the pain caused by the bone thorn.
2. The use of fat to repair damaged tissues due to calcium deposition in the foot.
3. Using fat as an insulating cushion between the thorn and the nerves that transmit pain and help relax the tendon between the heel and the toes.

### -the risks of the study

1. Swelling in the injured heel as a result of the injection was achieved from two to three months.
2. Complete sterilization will reduce this percentage to a degree.
3. Under direct pressure after injection, the stem cells in the injected fat may die.
4. Contamination is possible, but considering complete sterilization methods, this proportion will be reduced to a minimum

## • conclusion

- We found that the field of orthopedics should be linked to the field of the specialist in plastic surgery, by suctioning the excess fat in the human body and injecting it into the heel of the patient suffering from bone spur pain so that the fat surrounds it. bone thorn

Fat is suctioned from the patient's body and surrounds the bone spur with this fat to form an insulating layer between the bone spur and the foot in order to absorb the pain of the bone thorn and erase the impact of bone bruising on the foot and help to relax the tense tendon due to the bone spur and thus the patient does not feel it and can live with it without pain

- After studying the characteristics of the foot and the fat that will be injected

### **Types of fat in the human body**

1. brown fat
2. white fat
3. beige fat
4. essential fat
5. subcutaneous fat
6. visceral fat

- According to our treatment method, subcutaneous fat should be used

## • Application

1. A board-certified plastic surgeon carefully and precisely removes excess fat through a small hollow tube called a cannula.
2. The extracted fat is added and we will insert this fat next to the bone spurs.

**Our project will be a breakthrough in the field of medicine, as it:**

1. Removing the pain caused by the thorn of the bone, because it helps to relax the tendon.
2. Using fat to repair damaged tissues as a result of calcium deposits in the foot.
3. This will not only help in solving the problem of bone spurs pain, but will also help in solving any problem that exists in the heel of the foot if it is feeding on fat.

Our project will be implemented on the ground through the following:

1. Places where the research will be conducted on patients: on the basis of the outpatient clinic in the hospital.
2. The research method is underway for the first time. It is a phase 1 clinical trial. According to Egyptian Law No. 204 of 2020, the number of cases recommended in the first phase ranges between 20 and 80. Therefore, in our project, we chose to apply our idea to 30 patients (who suffer from osteochondrosis) and these patients are selected according to certain criteria. After the fat is injected, the patient will be followed up

### • Research sources

- ABCS. (2021, march 17). *How to Choose Between Liposuction and Noninvasive Fat Reduction Procedures*. Retrieved 11 11, 2021, from americanboardcosmeticsurgery: <https://www.americanboardcosmeticsurgery.org/cosmetic-medicine/how-to-choose-between-liposuction-and-noninvasive-fat-reduction-procedures/>
- Ansonge, R. (2020, august 28). *Heel Spurs and Plantar Fasciitis*. Retrieved 11 11, 2020, from webmd: <https://www.webmd.com/pain-management/heel-spurs-pain-causes-symptoms-treatments>
- Brunilda Nazario, M. (2020, september 22). *Bone Spurs*. Retrieved from webmd.: <https://www.webmd.com/pain-management/what-are-bone-spurs>
- Cedars-Sinai. (2021). *Bone Spurs*. Retrieved 11 17, 2021, from cedars-sinai: <https://www.cedars-sinai.org/health-library/diseases-and-conditions/b/bone-spurs.html>
- Clinic, C. (2021). *Bone Spurs (Osteophytes)*. Retrieved 11 15, 2021, from my.clevelandclinic: <https://my.clevelandclinic.org/health/diseases/10395-bone-spurs-osteophytes>
- College, T. P. (2021, april 12). *Taking aim at belly fat*. Retrieved 11 10, 2021, from health.harvard.edu: <https://www.health.harvard.edu/staying-healthy/taking-aim-at-belly-fat>
- Staff, M. C. (2019, october 17). *Bone spurs*. Retrieved 11 17, 2021, from mayoclinic: <https://www.mayoclinic.org/diseases-conditions/bone-spurs/diagnosis-treatment/drc-20370216>

