



The concept of Spark Wave Therapy (SWT) assisted penile tissue hyperplasia: A non invasive potential alternative to Augmentation Phalloplasty

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Introduction

Spark Wave Therapy (SWT) is a special kind of shock wave therapy which is used as a first line therapy for vasculogenic erectile dysfunction in many developed countries. It works on the basis of Angiogenesis and tissue regeneration.

Augmentation Phalloplasty surgery is also known as penis enlargement surgery, is usually performed in patients with Phallic Dysmorphic Disorder(PDD) and patients with microphallus It is done to increase penile length and(or) girth(circumference) or both. The aim of this research project is to assess the possibilities to utilize the SWT to induce penile tissue hyperplasia and to establish this non invasive procedure as an alternative for Augmentation Phalloplasty surgery.

Materials and methods

Usage of penile traction device and penile hydropump causes the penile tissue to be stretched and expanded. As a result microtears appear in the penile tissue. Due to body's own repair mechanism, these microtears heal by the mean of cell proliferation which results in penile tissue hyperplasia. This same principle is used by some African tribes to enlarge lips and ears. The acceleration and completion of the repair process depends on several factors. One of these factors is angiogenesis which ensures the proper environment for cell proliferation by the mean of improving hemodynamics.

Spark Wave Therapy (SWT) induces angiogenesis by creating microtears in the local small blood vessels and as a response the body releases angiogenic growth factors such as VEGF, eNOS, PCNA etc. to repair those microtears thus inducing the process of Angiogenesis. That's why SWT can be utilized to ensure acceleration and completion of the repair process of penile tissue microtears by the mean of Angiogenesis. More over spark wave therapy (SWT) induces migration of mesenchymal stem cells to the treated area. The "proliferation and differentiation" properties of the stem cells can be utilized to further accelerate and complete the repair process. These stem cells also induce angiogenesis by the means of proliferation, differentiation and releasing growth factors which induce angiogenesis. And additionally these stem cells produce cytokines to send signal to the surrounding pre-existing cells to initiate the process of proliferation.

For continuation of the process of Angiogenesis, frequent vasodilation is required which can be ensured by increased production of Nitric oxide. Nitric oxide is produced from the amino acid L arginine by the enzymatic action of eNOS. Using L citrulline supplementation ensures a constant bioavailability of L arginine thus frequent vasodilation occurs due to increased nitric oxide production which is essential for improved hemodynamics which supports the process of Angiogenesis to be continued.

Results and discussion

Findings

As a result of the combination of Angiogenesis(inducing vascularization and improving hemodynamics) and cell proliferation(pre-existing cells and stem cells), penile tissue hyperplasia occurs which results in increased penile length and girth(circumference) permanently without any damage to erectile function.

Comparative assessment

Augmentation Phalloplasty surgery

Advantages

The only advantage of Augmentation Phalloplasty surgery is its precision. This surgical procedure has already been introduced, tested and performed.

Disadvantages

The penile lengthening procedure involves cutting the suspensor ligaments of the penis which results into lowering of erection angle. Moreover when the healing occurs by the mean of scar tissue formation, the penis may become retracted thus may result in penile shortening.

The girth augmentation procedure sometimes involves free fat transfer (FFT) to the penis. Losing of some of the transplanted volume usually results in deformity. The usage of dermal fat grafts (DFG) usually results in occurrence of infection. When allografts are used to augment penile girth, it sometimes results in graft rejection and occurrence of infection. Same disadvantages apply for usage of silicone grafts to augment penile girth.

SWT assisted penile tissue hyperplasia

Advantages

- No change in erection angle
- No risk of infection
- No chance of penile shortening
- No chance of penile deformation

Disadvantages

The only disadvantage of this procedure is that, it is not yet tested and introduced.

Conclusion

Spark Wave Therapy (SWT) assisted penile tissue hyperplasia can be considered as a non invasive alternative for Augmentation Phalloplasty surgery. But to assess the potentiality, proper clinical trials are required.

The same properties of Spark Wave Therapy (SWT) can be utilized in the case of increasing the survival chance of autografts such as dermal fat grafts (DFG) and free fat grafts (FFG) which are widely used in penile girth augmentation surgery. But proper clinical trials are required in this case as well.

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