

Spring-loaded Syringe for Multiple Rapid Injections

CR Srinivas, Anirudh Somani, CK Shashidharan Nair¹, Thirumurthy Mylswamy

Department of Dermatology, Venereology and STD, PSG Institute of Medical Sciences and Research, ¹Department of Applied Sciences, PSG College of Technology, Coimbatore, Tamil Nadu, India

Abstract

Mesotherapy refers to multiple injections of small quantity of the drug over a large area. The mesoguns available are expensive and the motor-driven models tends to waste the expensive material to be injected since the plunger stops after injecting without recoil. We searched for a less expensive device which would inject like the mesogun and still not waste the solution. On searching the web, we identified a spring-loaded syringe. We describe the assembly and use of this inexpensive syringe for delivering multiple injections with minimal wastage.

Keywords: Intralesional injections, mesogun, mesotherapy, platelet-rich plasma, spring-loaded syringe

INTRODUCTION

‘Mesotherapy’ is a non-surgical, minimally invasive method of drug delivery that consists of multiple intradermal or subcutaneous injections of a mixture of compounds ‘melange’ in minute doses.^[1] It has gained disrepute because of inadequate scientific evidence to prove its efficacy. In spite of this, many new substances such as platelet-rich plasma (PRP), peptides, growth factors and collagen are finding their way to enter the field of mesotherapy.^[2] Since small amounts of material have to be injected by multiple pricks rapidly over a large area, mesogun is used. Mesogun is a motor-driven equipment that can be used to rapidly deliver the chemicals into the skin and subcutis. However, most mesoguns are expensive and tend to waste material due to dripping from the needle postulated to be due to rapid withdrawal [Figure 1].^[3] While this may not be significant in financial terms when inexpensive substances are injected, products such as PRP or meso solutions for injection which are either expensive or too precious should not be wasted. The cause for dripping is possibly due to lack of minimal recoil, following the injection by the motor-driven plunger. On searching the web, we found a syringe with a spring attached to the piston which would provide the recoil needed to prevent dripping. Since these syringes are not freely available, we modified the available disposable syringe to rapidly deliver small quantity of

material into the skin, similar to a mesogun. A 5 ml syringe or an insulin syringe is taken and the piston is removed from the body and a spring which is sterilised using ethylene oxide is inserted onto the piston which is inserted back into the body of the syringe [Figure 2]. The material to be injected is drawn into the syringe and the regular needle is replaced with the Meso needle. The specifics of the spring provided for the purpose of duplication and standardisation used are as follows:

Spring for 5 cc syringe

Length - 37 mm, thickness - 1.21 mm, pitch - 4 mm, outer diameter - 15 mm, inner diameter - 12.6 mm, spring constant (k) = 1300 N/m.

Spring for insulin syringe

Length - 71.30 mm, thickness - 0.75 mm, spring outer diameter - 5.7 mm, spring inner diameter - 4.58 mm, spring constant (k) = 890 N/m.

Spring constant (k) is calculated as follows:

The spring constant of a spring represents the force required to deform it by a certain amount. As most springs obey Hooke’s

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Address for correspondence: Dr. CR Srinivas,
Department of Dermatology, Venereology and STD, PSG Institute of
Medical Science and Research, Coimbatore - 641 004, Tamil Nadu, India.
E-mail: srini_cr_1955@rediffmail.com

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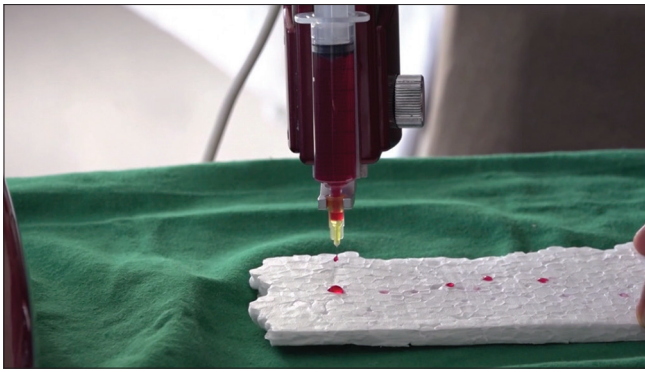


Figure 1: Wastage of injectable material from mesogun

law, the spring constant k is treated as a constant characteristic operational parameter for the spring.

In the case of helical coiled springs, it represents the force required to extend (or compress) the spring by a certain length. It is expressed in N/m. Experimentally, it is measured by fixing it at one end and applying a force 'F' on the other end, along its axis, causing it to extend by a length x . The spring constant is then calculated by the formula:

$$k = F/x$$

F is expressed in Newton and x is in metres. Then, k is expressed in N/m.

With this syringe, small quantities of material can be injected by first piercing the needle into the tissue, pressing the piston using the thumb and removing the thumb which results in the recoil of the piston; the syringe is withdrawn from the skin, following which the next site is injected [Video 1]. Before disposal of the syringe, the spring can be removed and retained for reuse after sterilisation. The approximate cost of the spring-loaded syringe would be 30



Figure 2: Spring-loaded 5 cc syringes

INR for the 5 cc syringe and 26 INR for the 1 cc syringe. The cost of the reusable spring is 15 INR. Thus the modified spring loaded syringe can be an efficient, cost effective method of drug delivery for mesotherapy and intralesional injections.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Raghvendra, Tyagi S, Yadav P, Saxena S, Dodia RA, Patel TD. Mesotherapy – A non-surgical cosmetic medicine treatment: A review. *Int J Pharm Sci Rev Res* 2010;4:45-7.
2. Konda D, Thappa DM. Mesotherapy: What is new? *Indian J Dermatol Venereol Leprol* 2013;79:127-34.
3. Kim S, Kye J, Lee M, Park B. Evaluation of mesotherapy as a transdermal drug delivery tool. *Skin Res Technol* 2016;22:158-63.