



Technical Report

Configurations

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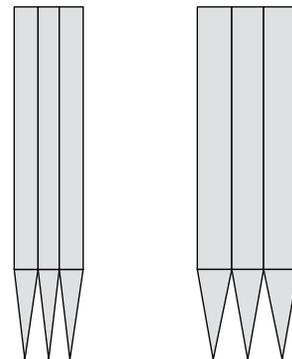
When considering tattooing from a technical standpoint, the design and subject matter must become irrelevant. No matter how sophisticated the work is, tattooing can be reduced to three basic techniques. There are lines, there are areas of solid color, and there are areas of tonal gradation (shading). The aesthetic and creative sensibilities of individual tattooers bring forth the seeming diversity of styles in the trade, which is only a combination and variation of these three elements. The tools used for each effect are different and of the utmost importance. The needle configuration, in conjunction with the tube and machine, must be working in such a way that the desired, and anticipated results are achieved. No single machine can be used efficiently to do all types of tattooing, nor can one type of needle configuration.

In this report we will discuss the theory of needle configurations, focusing on the importance of distance between points in configurations, and the actual diameter of the needle's point that penetrates the skin. We will also discuss the tube, and its relation to the configuration, how the configuration is attached to the machine, as well as methods of soldering needles into various configurations.

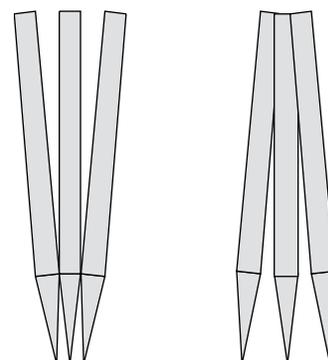
There are two major concepts that must be understood fully before attempting to make any needle configuration. The first is the distance between the points of any needles in a group. The second factor that must be considered, is the distance into the skin that the needle will penetrate.

These two equally important concepts form the basic structure of all needle configurations. That is, how deep the needles penetrate the skin, and how close together the needles are to each other.

The distance between the points of any needles in a group is determined initially by the diameter of the needles being used. Simply stated, a group of small diameter needles placed side by side will have their points closer together than a group of needles of a larger diameter.

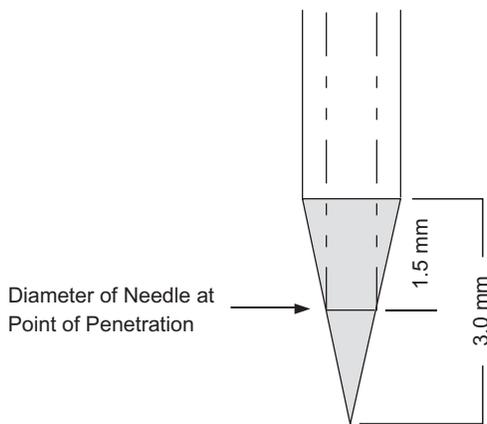


Understanding this, you can see that the points can be moved closer together, or moved apart by spacing the needles.



The distance into the skin that the needle will penetrate is determined, for the most part, by the machine and how it is utilized. This will vary from tattooer to tattooer. As a relative measure, pigment is deposited to a depth of approximately 1.5 mm.

Therefore, if the needle is only penetrating 1.5 mm, that 1.5 mm from the tip of the needle's point to 1.5 mm up the shaft of the needle is the most important, and must be considered carefully. Shaft size is relevant, but it is more important to consider what the diameter of the needle is, at 1.5 mm. If the cut or taper of the needle is 3 mm in length, the diameter of the needle at 1.5 mm will be approximately half the diameter of the shaft of the needle. This is the diameter that will be in the skin.



Configurations can be categorized in different ways. All configurations share some characteristics, and are unique in others. Most commonly, configurations are referred to by their basic shape – round or flat, and their intended use as a liner or a shader. The three basic categories are: circular configurations for lining, circular configurations for shading and coloring, and flat configurations for shading and coloring.

Circular Configurations For Lining

When making configurations for lining, the objective is to obtain the desired line weight. This is influenced by the number of needles used, the diameter of the needles, and the tightness of the finished configuration.

Circular configurations can be examined in theory as each needle being represented by a circle and the group of needles forming a larger circle. (Diagram page 4) From this the percentage of area can be evaluated and the overall shape of the configuration can be considered.

Obviously, the smallest possible line will

be obtained by using a single needle, of a small diameter. However, single needle configurations are problematic. They are not rigid enough to be controllable. They must be solidified with backing needles, the single needle being soldered to the backing needles, but far enough forward of them to be used on its own.

Using the diagram on page 4 as a guide, evaluations of other circular configurations can be made. Six needles are virtually impossible to articulate into a round configuration. Seven needles form geometric precision, with consistent spacing of all needles with no center gap. The center gap present in three, four, and five needle configurations should be overcome by tightening the configuration in a jig.

The diameter of the needles being used must be considered. A five needle configuration made of .33 mm diameter needles will produce a line approximately identical in weight to a seven needle configuration made of .30 mm needles.

Once the configuration that should work best has been chosen, a simple means of soldering these configurations must be devised. There are many jigs available for soldering configurations. Many tattooists use a drill gauge or a jewelers draw plate. Both tools are metal plates, with sized holes through them. The incremental sizing of the holes in these plates allow any degree of tightness required of a round configuration to easily be achieved. When working the points of a round configuration into any type of jig, there is always a possibility of damaging the point of any or all of the needles in the configuration. An eye-lupe must be used to check that the points are not damaged at any stage of soldering.

To solder needles into a round configuration, the points must initially be lined up, and the back ends of the needles tacked together with solder. This holds the points all at a consistent length, and the approximate shape of the finished configuration is set out. That is to say, you cannot tack four or more needles out flat, and then work them into a round configuration. The outside needles will come up short. A round configuration of needles must be made from start to finish, in a round shape. The only exception to this is round three needle configurations, in which the needles can be tacked out flat, then pulled into a round shape at the finishing stage. The two outside needles will still be slightly back, but almost immeasurably so, and well within acceptable tolerances. Once the ends have been tacked, the configuration will be soldered down, leaving the correct amount of point exposed. With some trial and error this distance will be determined. Ultimately this distance is a matter of personal preference.

Anywhere from 1.5 mm to 5 mm is common. Round configurations will have the second stage of soldering done in a jig so that the needles are in the exact positions desired. This secondary soldering will complete the configuration.

Circular Configurations For Shading and Coloring

Round configurations can be spread, making them effective shaders or coloring configurations. These configurations are referred to as round magnums or round mags. These configurations are very versatile and generally made with seven or more needles. They are made by following the same procedure used to make round configurations for lining, leaving more of the needle points not soldered, approximately 5 mm. The configuration is not tightened in a jig, but is soldered so the needles are straight down, the jig being used to keep the configuration in a perfect circle. Once the soldering is complete the spacing is accomplished by pushing a single-edged razor blade between the needles to slightly increase the distance between the points of the needles. The spacing should be approximately the same as that of a flat magnum and consistent between all of the needles.

Flat Configurations For Shading and Coloring

Flat configurations are generally used to achieve tonal gradations in tattooing. They are a number of needles, most commonly five, six, or seven, soldered side by side, with no spacing. The length of needle at the point, left not soldered is variable, from approximately 2 mm to 5 mm, and will change the effect of flat shaders.

Flat shaders can be spaced, but only with configurations of odd numbers, seven needle configurations being most commonly used, but five and nine needle configurations are used as well. Spaced flat configurations are widely referred to as magnum shaders, or mags. The procedure for soldering mags differs from that of soldering flat configurations in that, once the needles are lined up, in parallel, with the points at a consistent length, the ends are tacked with solder. Then a spacer is woven through the needles, so that the needle on the outer edge of the configuration is under the spacer, the needle next to it over the spacer, and so forth, with the

last needle being under the spacer. This produces a symmetrical configuration, which is why an odd number of needles are used to make magnum shaders.

The configuration, with the spacer in place, is then placed on the work surface to be soldered. A single edged razor blade works well as a spacer, generally just the very edge of the blade is between the points of the needles, but the further up the needles that the blade is placed, the greater the spacing that will be caused. This is variable, and will change the effect of magnum shaders. The configuration is soldered with the spacer in place. The length of needle at the point, left not soldered is variable, from approximately 2 mm to 5 mm, and will change the effect of the configuration.

How the needle bar is attached to the machine is important. It must be stressed that no play at this connection of needle bar to machine is optimum. There are two methods of achieving this. If cloth tape is used, there should be enough on the armature bar so the eye of the needle bar fits snugly over it. The tape must be replaced regularly, as any play at this connection point will adversely affect the process. Dense vinyl grommets serve the same purpose as tape, and they too must be replaced regularly. Tube tips have an effect on the tattooing process, as well, and should not be overlooked. Tube tips wear on the bottom from contact with the needle configuration. This results initially in a small groove, and a split in the wall or the tube tip eventually. Friction between the needle configuration and the tube tip should be minimal. Tips must be replaced regularly.

The difficulty in testing different things is that any change in procedure will seem odd or uncomfortable at first. Each tattooer will find certain tools more suitable than others. Certain configurations will work effectively for some tattooers, but not for all. Configurations in conjunction with the tube and machine will determine success. Certain configurations demand special things of the tattoo machine. How the machine runs is extremely important, with a direct affect on the outcome of the tattoo. Everything works in unison, as parts of an entire process. There is no substitute for the complete comprehension of the tools being used.

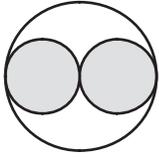
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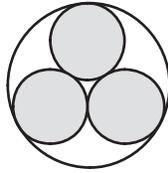
Arlette, John Philip M.D., F.R.C.P. (c), Donald William Groot M.D., F.R.C.P. (c), and Patricia Anne Johnston, M.C.I.Sc. "Comparison of the Infrared Coagulator and the Carbon Dioxide Laser in the Removal of Decorative Tattoos." Journal of the American Academy of Dermatology, Volume 15, Number 3 (Sept. 1986), p. 521.



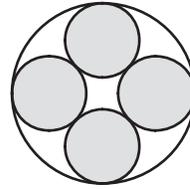
area of one needle - 0.786
 area of outer circle - 0.786
 100% area filled



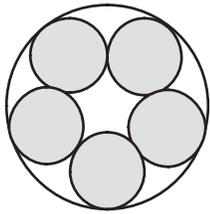
number of needles - 2
 total area of group - 1.572
 area of outer circle - 3.142
 50% area filled



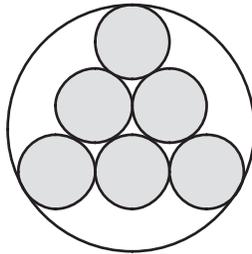
number of needles - 3
 total area of group - 2.358
 area of outer circle - 3.686
 63.9% area filled



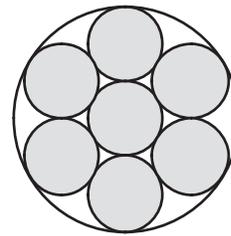
number of needles - 4
 total area of group - 3.144
 area of outer circle - 4.578
 68.6% area filled



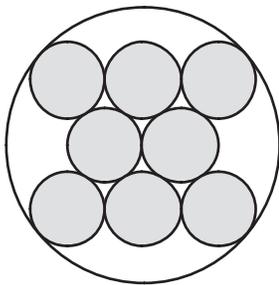
number of needles - 5
 total area of group - 3.93
 area of outer circle - 5.77
 68.1% area filled



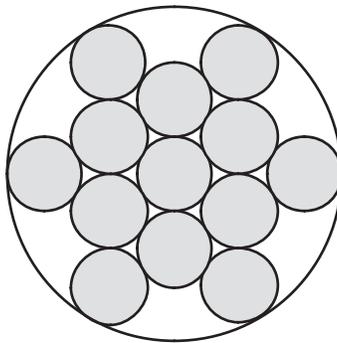
number of needles - 6
 total area of group - 4.716
 area of outer circle - 8.556
 55% area filled



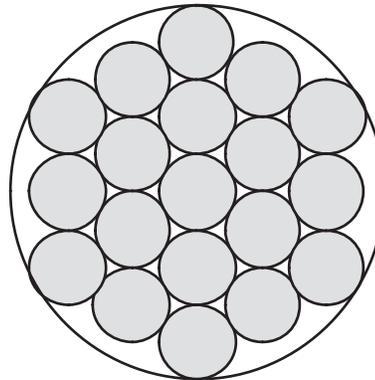
number of needles - 7
 total area of group - 5.502
 area of outer circle - 7.071
 77.8% area filled



number of needles - 8
 total area of group - 6.288
 area of outer circle - 10.524
 59.7% area filled



number of needles - 13
 total area of group - 10.218
 area of outer circle - 15.516
 65% area filled



number of needles - 19
 total area of group - 14.934
 area of outer circle - 19.642
 76% area filled