Dealing with a Hybrid Trumpet Punch

Arthur Tykocinski, MD, FISHRS | *São Paulo, Brazil* | arthur@cabelo.med.br

Demonstration video: https://youtu.be/jFAOQ9GIUpY

The Hybrid Trumpet punch was conceptualized by Belgian surgeon, Dr. Jean Devroye. He began by rethinking the two-step concept first proposed by Dr. Jim Harris in which a sharp punch first makes a shallow incision, next, a second dull punch completes the deeper dissection. Finding this time-consuming, however, Dr. Harris then developed a single motorized dull punch with round edges that could penetrate the skin as it rotated while producing low transection rates. However, with this punch, the fast and dull friction could cause damage by "burning" the scalp with the punch edges, sliding or slipping when trying to engage the epidermis, and torquing or spinning the graft. Looking to combine the Harris two-step concept into a single instrument, Dr. Devroye began development of a punch that could cut the epidermis at low speeds and yet still dissect the graft without transecting the follicles within it. His result was the Hybrid Trumpet punch (Devroye Instruments), which I had the privilege to test and learn to use during a visit to his clinic in Brussels.

Dr. Devroye's Hybrid Trumpet punch is a flat punch that uses the same concept found in skis and snowboards: a flat surface with a hard metal border in a square shape with 90° angles forms a sharp semi-cutting edge. All punches have an external border and an internal border. The flat punch has a sharp square-shaped external border, sharp enough to cut the scalp under pressure and low speed; however, the internal border cannot be sharp and has to be smooth in order to dissect the graft forward without cutting or transecting it (Figure 1). That is the reason this design allows the hybrid trumpet punch to go 1mm deeper compared to a sharp punch (Figure 2). If you perform FUE, you know that this extra 1mm of depth makes the entire difference: it's much easier to remove the graft (as there are fewer attachments) and the graft is more elevated so that it can be gently removed—avoiding the sometimes stronger, riskier, and damaging movements required to extract the graft when the incision isn't deep enough. Also, it leaves more fatty tissue surrounding the graft, which provides extra protection from potential damage due to dehydration and placing trauma.

The layers of the scalp are firmer from top to bottom. The firmest layer of the scalp is the thick epidermis due to the keratin in it. The more superficial, the more keratinization occurs. Therefore, the physician needs to exert some pressure to cut through it, and also needs to use the sharpest part of the punch to penetrate it. Here is where a sharp punch (Figure 2) provides a benefit: the sharper the punch, like the Serrounded punch (Cole Instruments), the less pressure needed. Therefore, the Hybrid Trumpet punch (Figure 1) should be sharp enough to properly perform this step, whereas a totally blunt punch would need high speed to penetrate the epidermis. Typically, for this step, pressure is applied and the punch movement, oscillation, is started without advancing it. As the sharp external border cuts this firm layer, the graft moves into the punch (not the punch into the skin). Once the firmest part of scalp is totally scored, then it is possible to penetrate deeper with reduced speed, as the resistance will progressively decrease. In this step—the dissection phase—the Hybrid Trumpet punch provides an advantage to the physician. The super sharp punch, which was great for the cutting/scoring step, now is dangerous for the gentle follicular structures and softer surrounding tissue, increasing the transection rate. The Hybrid Trumpet punch is constructed not to cut when moved forward and therefore can dissect deeper with minimal effort. The penetration part is easy: you just have to let it go. But with a sharp punch, it is the most dangerous step and it is easy to cause transection.

FIGURE 1. Hybrid trumpet trumpet punch model and description (actual trumpet punch inset).

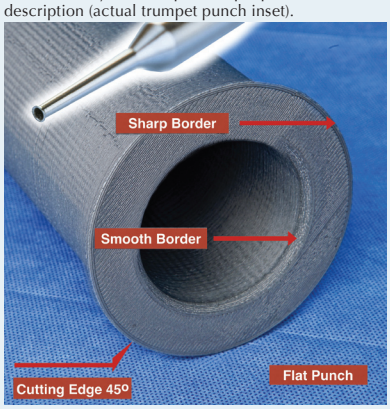

FIGURE 2. Sharp punch model and description.

Ideally, a punch should have a semi-sharp cutting edge to cut at lower speeds. The Hybrid Trumpet punch is sharpest on the external square edge corner (Figure 1) when positioned at a 45° angle in relation to the skin. Therefore, to cut the scalp, the punch should be pressed on the surface at this 45° angle and an oscillation speed used that will allow the epidermis to be incised. Once the firm part of the scalp under that edge is incised, a lip is created. To complete the entire circular incision and cut the firm epidermis, different maneuvers can be used (see the basic movements noted below). Once the epidermis is completely incised (scored), the punch is moved forward to complete the deep dissection. Since the internal border is smooth, a progressively slower oscillation is needed to travel from under the epidermis to dermal papilla. A very gentle grip is recommended to allow the follicles inside the punch to guide the dissecting advance. Since the blunt internal border is in contact with the graft, the punch can be advanced the full length of the follicles. The motor is then stopped and the punch is removed from the skin. As with any sharp instrument, the Hybrid Trumpet punch loses its cutting edge over time and has to be replaced.

Dr. Devroye also developed a foot pedal, which is the controlling unit. It is very ergonomic and intuitive to use. The commercial model (WAW FUE system) has three dials: one to adjust the angle or arc of oscillation, a second to adjust the speed of oscillation, and a third to modify the initial speed of the punch. When pressed, the pedal increases the oscillation speed and angle of the punch. I typically use an oscillation angle or arc from

90°-180°. In firm skin, the speed of oscillation may need to be increased. Also, it is possible to completely suppress the oscillation and change to rotation, but the transection rate will increase.

The Hybrid Trumpet punch combines the benefits of a sharp and a dull punch into one instrument. It is as fast as the sharp and as reliable as the dull. It doesn't produce the typical friction marks that I have observed on scalp holes made with dull punches, and it avoids the torsion also produced by them when used in full rotation. On the other hand, the system produces clean-cut grafts, like the sharp punch, but with extremely low transection rates and more fat and protection around the follicle.

Dr. John Cole once mentioned in a lecture that "if something isn't going as well as expected, take a break, get a coffee, and think of something different to do." Having used the Hybrid Trumpet punch system for a year, so far these are my takes on how to deal with the Hybrid Trumpet punch with different scalps.

BASIC MOVEMENTS (CUT TO THE SIDES AND DISSECT FORWARD)

1. Simple Engagement (Harris)

Align it (the punch with the hair shaft angle), centralize it (put the hair inside the punch and center it), engage it (with gentle pressure to ensure that the entire punch borders are touching the skin) and initiate oscillation by pressing the pedal—keeping the punch still until it cuts the epidermis, which enters inside the punch. Then, with a light movement, let the punch penetrate the scalp, guided by the hair shaft, using just the handpiece weight, until reaching the dissection depth.

2. Edge Pressure (Devroye)

Follow the same steps as above: align it, centralize it, and engage it; however, while starting the oscillation, apply gentle pressure on the edge, over the punch corner, before moving forward. This pressure on the scalp made with the corner of the punch takes advantage of the flat square border design and allows it to cut under low speeds. Once you break the skin, just move forward and penetrate smoothly. Again, with a light movement, let the punch penetrate, guided by the hair shaft using just the handpiece's weight, until completing the dissection depth.

Additional Movements

A sharp punch has a sharp frontal face that easily cuts forward. The cutting edge of this semi-sharp Hybrid Trumpet punch has a flat frontal face, which is entirely different. It is important to allow the skin, with firm pressure, to enter the lumen of the punch before attempting to oscillate and cut the skin; if not, the flat, frontal face of the punch will bury the graft (Figures 3, 4, and 5). Most of the time, the buried graft will come to the surface, but this is not a rule or guaranteed. To address that issue, I have developed some maneuvers that facilitate the graft entering the punch lumen. The movements, described below, should be done before cutting all anchor points. If the graft is fully released, but not firmly in the lumen of the punch, it is easier to bury the graft with minimal pressure.

3. Back-to-Front Swing (Tykocinski)

The same as edge pressure, but instead of applying gentle pressure, this time you will perform a short-and-fast backswing after the engagement, while starting the oscillation. The swing should be enough to visibly stretch the scalp backwards until you break it. Then release the pressure and you will swing to the front. Very important: Before moving forward to complete dissection, you will need to realign the punch with the hair shaft's original position. Once realigned, move forward to complete the dissection, basically using just the weight of the handpiece. Hold it gently and let it go. Let the hair shaft guide the movement, not you! This extra swing helps to cut thick or firm scalps, where you would need to apply more pressure, more speed, or more rotation, consequently increasing transection. This back-to-front swing movement resembles that of a "diver": getting back and pushing down before jumping into.

4. Lateral Swing (Tykocinski)

Similar to above, but instead of performing a back-to-front swing movement, you perform a lateral swing: first to one side, then to the other, then realign and penetrate. This movement resembles "putting on tight jeans": you have to swing side to side in order to get inside. This is useful for areas where the scalp is too thick and mushy, such as in the lower occipital area.

5. Circular Swing (Tykocinski)

Instead of to the sides, the swing is all the way around, like a "can opener." Of course, this is the riskiest swing concerning transecting hairs, but it could help on exceptional cases with extra firm scalps. As always, realign with the hair shaft before penetrating.

The less movement, the better, because there is less chance of transection. Typically, the simple engagement will work for easy cases with perfect hair and scalp. Average cases will mostly work with the edge pressure for the best/easier areas and the back-to-front swing on thicker scalp areas. Difficult cases with too thick, hard, or mushy scalp will use a combination of back-to-front swing, lateral swing, and circular swing, according to scalp thickness and punch sharpness.

Having used a rotating sharp punch for several years, I never loved it; despite harvesting quality grafts with reasonable transection rates (below 8%), the results were somewhat inconsistent. Some cases could produce unreasonably higher transection rates, at times reaching a stratospheric 15%, which, for me, is a "Stop doing it!" I tried several punches and handpieces and felt really bad for not achieving the desired quality. Nevertheless, to my surprise, in many FUE workshops I attended, I saw many surgeons producing transection rates over 10%! Not just that, but that issue was not even mentioned or researched. No microscopic vision of the extracted follicles, no chart showing the transection rates in 1-, 2-, 3- or 4-hair grafts. I had my Zeiss loupes there with my LED light and could check it out. They explained they didn't care because these transected hairs will regrow. Some physicians even recommend to have transection to get better cosmetic results in the donor area, but this is another long story to discuss. I am not sure about all that and feel much more comfortable using small punches and getting lower transection rates. There are some surgeons who get high-quality grafts using small sharp, generally manual, punches, however, it is more difficult and laborious.

FUE is typically a "box of surprises," and even experts can have

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a hard time. Moving from sharp to the Hybrid Trumpet punch, I was mostly impressed by how consistent and reliable it was. This punch and matching pedal made me feel more confident. Since it adjusts to a range of misalignments and imperfect centralization, it helps prevent transection. This also makes its use forgiving with a faster learning curve. It accommodates a range of imperfections created by the average human being. Not just the incision is easier, but adding this extra 1mm in depth (compared to a sharp punch) makes removing the grafts a simple task.

There is one difficulty I noted using a Hybrid Trumpet or dull punch (including the robot): the missing grafts. This is a funny name, because they are not missed, they are buried. Some devices have incorporated aspiration to avoid buried grafts, but not this, yet. The buried grafts are mostly inside the scalp. Eventually, they will come up spontaneously after a few minutes; however, it's better not to rely on that. But why does this happen? There is no final conclusion on that issue. Dr. Devroye believes that the graft, losing its superficial attachments, tends to spin and therefore shrinks like a twisted towel. I believe that when there isn't enough time for the graft to be drawn inside the punch and there is too much pressure applied, the front edge of the flat punch (or a dull punch) buries the graft (Figures 3, 4, and 5). To avoid this, I realized that specific hand movements (swing) during the cutting phase (and sometimes during the penetration) could prevent buried grafts. I suggested three possible swings on basic movements: back-to-front, lateral, and circular. As an example, if you have ever tried to get into tight jeans, you probably realized that a swing movement is needed to get the "biggest part" into the jeans. Using too much pressure and no swing, the jeans will slide from your hands and you will get stuck. A Brazilian lesson…

I know surgeons who just use simple plastic glasses with only 2× magnification to perform FUE. Having worn glasses since I was 10 years old, I know I have no X-ray vision: I am just a nerd trying to do my job as well as possible. I tried 4.3×, then 4.5×, and finally moved to 5× magnification. These are all great and much easier to get used to. But when using my 6× Zeiss loupes, I got it. The vision and details are far superior to the 5× loupes. It's easier to centralize, adjust the angles, and, if desired, select subfollicular units with crystal-clear vision. The learning curve, however, is slower, because the depth of field is shallow.

Human × Machine: I had the opportunity to learn some FUE tricks and implanter techniques from Dr. José Lorenzo while visiting his clinic in Madrid. Dr. Lorenzo showed me not just great technique with a manual sharp punch, but also a careful and detailed patient planning approach. His gifted hands are tailored to follow his fast brain, producing reliable and quality results. He is an excellent teacher, one of the best I've ever had, but his skills are far better than mine. Knowing my own limitations, I knew that I needed to learn not just a great technique, but that I needed to also find an instrument that could allow me to reach the same level of results. The manual sharp punch is like the Olympic Games, where the results rely completely on personal skills. I needed a different setup, like what we have in Formula 1 Championship racing: a man and a machine working together, where the machine corrects the human imperfections, but is commanded by the human brain. (Several years before, I worked on that same approach for FUT, developing instruments, combining techniques, and defining surgical steps that allowed me to consistently get usually a perfect donor strip and mostly an invisible scar.) The robot is different; in my experience, despite having several controls, the robot mostly defines the surgical act, relying on several algorithms that are inaccessible to the surgeon. I think the robot limits the surgeon's brain and commands, because I like to be in command. For other surgeons, though, that might work.

FIGURE 3. Epidermis not incised or released circumferentially.

FIGURE 4. Further advancement of punch buries graft.

FIGURE 5. Epidermis becomes buried in the dermis.

"This is not a highway," I heard from the Argentina's Dr. Alexandro Chueco at the 2016 Paraguay FUE workshop. Speed, despite being desirable, is not the final goal. He is right. Still, the Hybrid Trumpet punch allows me to get 700-800 grafts per hour with very low transection rates (typically below 3%) and quality grafts with a 0.8-0.9mm flat punch. I believe that we are not competing for the most difficult and impressive surgical technique, but instead we are searching for the best cosmetic outcome, patient satisfaction, and preserving as much donor area as possible. The Hybrid Trumpet punch fulfills my need to offer FUE that results in quality follicular units with minimal transection. ■

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