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Curly Hair FUE: My Approach Using Classification of Follicle Curvature and Curl

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ABSTRACT

Specific knowledge of curved hair structures is necessary to be able to perform a successful surgery in this specific group of patients. In this article, we present a brief description of the cosmetic categories of curly shaped hairs and we establish a connection with the internal structure of this specific kind of hair. We introduce a classification based on seven predominant types, and we specify based on punch tip type, punch diameter, punch insertion angle, punch insertion depth, and punch centering, taking into consideration the specific characteristics of ethnic skin.

In my experience the Hybrid punch is the most adequate instrument to perform this surgery in a step-by-step approach. Because of the great variety of shapes and textures possible in a single patient, slow pace, testing, and constant adjustment is the key to completing a successful hair transplant procedure.

Keywords: curly hairs, follicular unit excision (FUE), hair transplant, Reyes Classification of Follicle Curvature and Curl

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Some patients of African descent tend to have a spiral or helical hair structure that is clinically referred to as tightly coiled. Others have the appearance of very curly hair, but when the grafts are extracted, we observe that the follicle structure is not so curved underneath the skin. There are a variety of curvatures, confirming that the internal curvature is typically an extension of what we observe externally. Recognizing that there are several varieties of curl, we cannot always apply the label Afro-textured hair. It's better to understand the specific curl characteristics of each case to tailor our approach during follicular unit excision (FUE) surgery.

In some patients with curly hair, FUE is easily performed by an experienced team using any type of punch; however, some types of curly hair can pose a significant challenge even for the most skilled surgeon. It is important to redefine the terms Afro-type or curly or curly kinky hair, so we can understand how some patients with extremely curly hair may show slight internal curvatures while others will pose a great challenge to the surgeon due to very tight follicle curves, curling, and growing parallel to the scalp.

TYPES OF HAIR CURL

Curl of the hair is where there is a curve in one direction and then curve in the opposite direction. The tufts of hair are intertwined, providing more volume. It is often thought that curly hair is intrinsically thicker, and the curlier it is, the greater the three-dimensional space it occupies. Hair curls can be classified into five distinct types (Figure 1).¹ This paper is dedicated to types 3, 4, and 5 as they are most frequently seen in the author's region because of the genetic typing that is more Afro than Caucasian.

Type 1 (Figure 1, 1) is a hair that takes 2-3 inches to form a curl; it looks like straight hair if shorter than 2 inches, hence the need to carefully examine it to not confuse it with Caucasian straight hairs.

Type 2 is a hair that needs 1-2 inches to form a curl, and I would characterize this type of hair as wavy. Figure 1 2A and 2B show the different kinds of wavy my practice frequently identifies.

Type 3 is shown in Figure 1, 3. This hair curl has a spiral pattern creating a "gentle capital E shape." This curl starts to form after 0.5-1 inches. This is the type of hair curl that most people have in mind

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FIGURE 1. Imagen curl types 1-5



when visualizing a curly hair: the curl being formed from a half inch to one inch off the skin.

Type 4 has a frizzier and compact “corkscrew” shape (Figure 1, 4). These curls are formed from one-eighth of an inch to half an inch off the skin and are known as curly/kinky. If the hair is shaved short, you cannot tell it is curly hair.

Type 5 is hair that is so tightly curled that it does not have sufficient length to express a curve. Its shape resembles locks of hair in the form of a Z (Figure 1, 5). These curls are formed less than 0.125 inches off the skin and the curly shape is evident, even when shaved short. This is the so-called kinky or Afro texture.

All of these types are curly: the difference among them is the distance from the skin where the curl starts to form.

TYPES OF INTERNAL FOLLICLE CURL

The external curls of the hair are indeed extensions of internal follicle curve.² Below the skin are curved forms that range from a J shape to a C shape (Figure 2). In my experience, I have even observed extreme curved forms so closed that I refer to them as “O” shape. Closed C to open C shapes are found in patients with type 5 or Afro hair. There are

FIGURE 2. Different types of follicles



many varieties in type 4 curly/kinky patients; they range from open C to J shapes to proximal bend, albeit very soft. Type 3 has very light curvature or a proximal bend shape. I have not studied the specifics of Types 1 and 2 because in general there is less variety in shape with these hair structures.

There is a direct relationship between the appearance of these various types of hair and the degree of complexity that will confront the surgeon during the surgery. The more closed the shape of the follicle curve, the more difficult the excision, because the follicles are positioned almost parallel to the skin surface. The perception is that these follicles are larger, but this is not always the case: sometimes it's because the curves themselves are very small.

In my team's approach to FUE surgery, the hybrid punch is always our first option, and the most used punch diameters are between 0.95-1.05mm (sometimes 1.10mm). The hybrid punch is preferable because the cutting edge is farther away from the follicle. The Devroye Serrated Tornado Punch, Trivellini Edge Out punch, Umar Intelligent punch, and Zero T punch by Cole are all effective; however, I prefer the serrated Tornado punch because most patients have the type of skin that is more firm and tough compared to other types of skin, and the serrated tip performs better in this situation.³⁻⁵

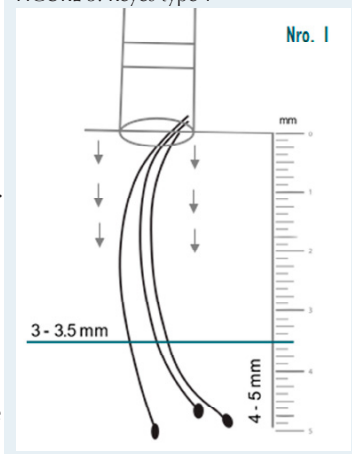
The donor area is shaved proceeding from the superior part of the donor area to the inferior, so that the shave is not too aggressive (when the hair is shaved from the bottom upward there is more risk the hair will be cut too short). I prefer to leave the hairs at a length of 1-1.5mm in the donor area because this length provides a good indication of the direction and angle of the excisions.

Through carefully observing a large number of cases, I have created the Reyes Classification of Follicle Curvature and Curl, which has seven predominant types. Of course there are outlier shapes, but these seven main categories apply to the majority of cases. I will describe each type and how I modify my FUE technique for each type.

Reyes Type 1 (Figure 3)

When the graft follicles are curved and long, in most cases it is not necessary to perform an arc movement during excision. I prefer to enter the punch perpendicular to the skin. These follicles have a length of 4-5mm, and can be cut to a depth of 3-3.5mm. By not using the arc movement, the procedure will be more efficient and go faster. These types of grafts, if the skin is favorable, allow me to use 0.9-1mm punches.

FIGURE 3. Reyes type 1



Reyes Type 2 (Figure 4)

In this kind of graft, the follicles are long, but at the ends, the follicles are splayed. Therefore, I insert the punch perpendicular to the skin up to a depth of 2.5-3mm. These follicles have a total length of 4-5mm, and when the skin is favorable, the 1mm punch can be used. But if the sub-

FIGURE 4. Reyes type 2

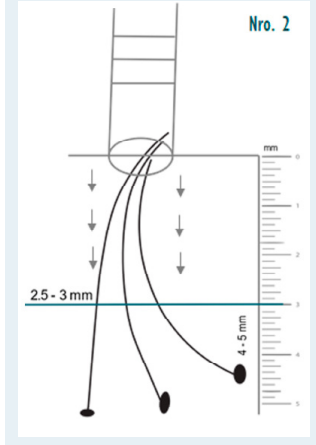
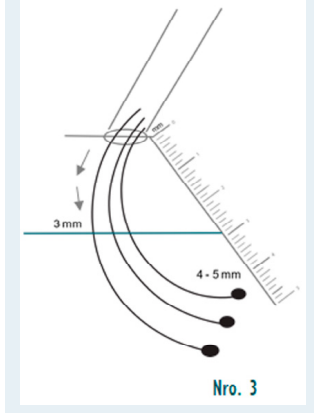


FIGURE 5. Reyes type 3



cutaneous tissue is firm, I prefer to use a larger punch of at least 1.05mm. Since the skin is so firm, I adjust the diameter of the punch as this facilitates a deeper dissection and less traumatic extraction.

Reyes Type 3 (Figure 5)

In this type of graft, the follicles have a more pronounced curve compared to types 1 and 2. Thus, I place the punch at an angle of around 85 degrees, and penetrate to a depth of 2.5mm and from there penetrate in an arc movement, imitating the curvature of the follicle, until reaching a depth of 3-3.5mm.

With these types of grafts, it is quite common to find intertwined hairs. Therefore, as you can observe in these first three figures, the punches are off-center, more towards the border of the superior edge of the punch, in relation to the grafts to be extracted.

Reyes Types 4 and 5 (Figures 6 and 7)

These grafts are shaped like an upside-down umbrella; they are small and have a length of 3-3.5mm. On occasion, hairs may be intertwined. The difference between type 4 and type 5 is that the level of splay in type 4 is larger. In these cases, the best punch to use will have at least 1mm diameter. I perforate in a perpendicular direction to a depth of at least 2-2.5mm. Going deeper would easily increase the percentage of transected grafts.

FIGURE 6. Reyes type 4

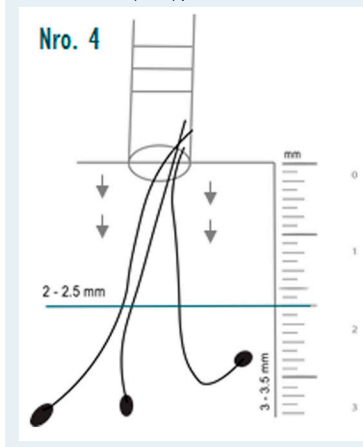
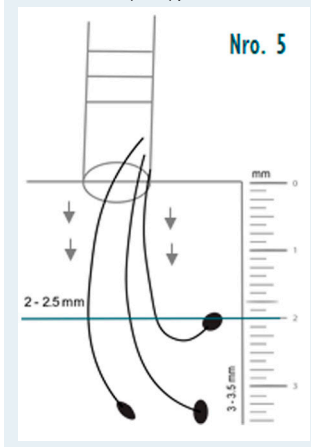


FIGURE 7. Reyes type 5



Reyes Type 6 and 7 (Figures 8 and 9)

These types of grafts are short because of the closed curve shape. They are small, measure approximately 2.5-3mm, and you can see different varieties of splay.

The punch should not be smaller than 1.05mm, and the perforation needs to be in a nearly vertical angle of around 85 degrees. I will perform an arc movement to a depth of 1-1.5mm and never go beyond the maximum depth of 2mm. In general, the skin of these patients is more adherent at the subcutaneous level.

FIGURE 8. Reyes type 6

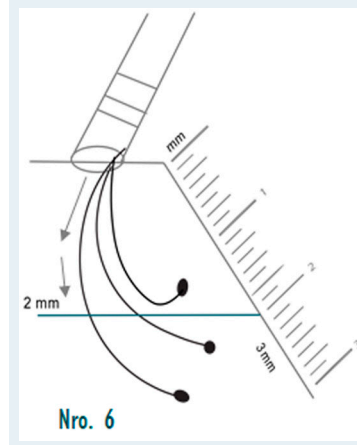
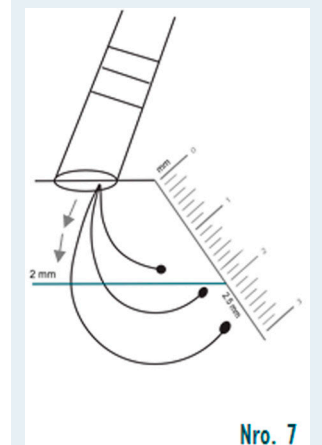


FIGURE 9. Reyes type 7



In my practice, we always perform a test at the beginning of and throughout the surgery and, if needed, adjust the size and type of punch as well as the depth and speed of movement.

For type 6 and type 7 grafts shown in Figures 8 and 9, we like to use the arc movement approach because of variations in the shapes and curves that can sometimes be observed in one single patient. We use the WAW or the Trivellini machine with the serrated trumpet punch and controlled movement.

The nature of the skin is fundamental because it provides an impression of the quality of the graft. The ideal skin for extraction is neither too firm nor very flexible. In tight skin with very firm subcutaneous tissue, we prefer to use minimal tumescence and always use a new punch. In such cases, it is also more difficult to perform an arc movement.

With skin that has more laxity, this can result in some loss of precision during the punch penetration because of the instability of the skin. This will cause a higher percentage of transection. In such cases, we use superficial tumescence and stretch the skin with our fingers or elevate the skin in between our fingers creating a small belly to achieve better precision.

Although we are all familiar with the standard techniques during extraction, I would like to add that with the most extremely curved grafts I prefer to make a more vertical movement during my manual extraction as this facilitates the optimal detachment of the graft from the donor area.

The hybrid punch is the punch of choice in this patient population.⁶ The use of tumescence should be conservative, depending on the skin type. Tests need to be performed throughout the excision process because the curvatures vary not only from one region to another in the donor area but also from one follicular unit to another.⁷

Knowledge of the structure of curved hair is necessary to establish an extraction strategy. Do not hesitate to increase the diameter of the punch, since many times the curved structure of the shaft must be fully incorporated within the perimeter of the punch.

In my practice, we always perform a physical exam and investigate for keloid history with these types of patients.

I perform a test before surgery when we are going to extract from areas outside the scalp, such as the beard area. I strongly recommend testing always when your patient has a specific type of hair that you are not very familiar with. I want to specifically investigate the level of scarring and the risk of hypertrophic scars.

Do not consider the above concepts as a guarantee to eliminate all transections. These patients typically have a higher percent of transection than occurs with straight follicles, especially in cases of closed curvatures and skin with high resistance or hardness.

CONCLUSION

There is a great variety of shapes and structures associated with the scalp of curly-haired patients. The outcome of surgery will depend on recognizing which variations are present and then adapting techniques during surgery according to the variations. The specific aspects of the techniques used by the surgeon will also impact transection rate and graft quality.

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