The Advantages of Small Incisions

Hair transplants can be placed into recipient sites created with circular punches and small linear incisions. The method creating the least amount of scar tissue causes less alteration is scalp morphology. It is of utmost importance to maintain the integrity, appearance, and feel of the scalp. Prevention of scarring will create the best aesthetic and least noticeable results with hair transplantation. The following factors explain, on a mathematical, anatomical, and theoretical basis, the advantages of small incisions.

1. Incisional damage: Incision length with 1mm diameter punch is equal to **"Pi"** x dia. or 3.14mm. Incision length with 45¡ microsurgical scalpel is 2mm. On average, both accept a graft containing 3-4 hairs. The increased incisional damage, 3.14mm vs. 2.0mm (1.14mm per site) is 36%. Performing 500 punches of 1mm diameter will create 57cm (22.4 inches) more incisional damage than 500 incisions 2mm in length.
2. Langer's lines: Incisions made in the sagittal plane are directly parallel to Langer's lines (of tension) and create the least amount of scarring. Circular incisions create more scar tissue by violating these lines of tension in 358 degrees (99.4%), as they are parallel to Langer's lines in only 2 degrees.
3. Fit: Incisions used for follicular units should be made to fit the size of the graft. Follicular units cut with experience and magnification are size consistent. Grafts placed into holes are made to fit the hole. These grafts are not perfectly circular. They are often square or irregular in shape, and are not sized consistently. Therefore a larger ring of scar tissue is created when using circular punches for recipient sites.
4. Removal of non-hair bearing skin: This is often cited as an advantage of circular punches. The surface area of skin of 1mm diameter circle is 0.785mm2 (**"Pi"** r2). The surface area covered by one hair of average diameter (0.07mm) is 0.0038mm2 (**"Pi"** r2). Four hairs present on a circular section of skin 1mm in diameter will occupy 0.015mm2. This is 1.9% of the surface area of that piece of tissue (0.015/0.785). When this amount of non-hair bearing skin is removed it is replaced with skin that is 98.1% non-hair bearing. In fact very little skin not bearing hair is actually removed.

Conclusion: By inflicting greater incisional damage, violating Langer's lines, and producing more scar tissue due to imperfect fit, recipient sites formed with circular punches create more scar tissue altering scalp morphology compared to recipient sites created by small scalpels. Additionally, the often-cited advantage of punches, the removal of non-hair bearing scalp, is not significant. These factors lead to more noticeable and less aesthetically acceptable results when punches are used in hair transplantation.