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# Lower Percentage of Sperm With Normal Morphology (NM) Using Strict Criteria Is not Associated With Lower Pregnancy Rates (PRS) Following Intrauterine Insemination (IUI)

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## Summary

There are many studies that suggest that sperm with  $\leq 4\%$  NM using strict criteria are subfertile and in vitro fertilization with intracytoplasmic sperm injection (ICSI) may be needed. However, not all studies agree on the clinical importance of the use of NM with strict criteria. One study of males with oligospermia found a lower PR following intercourse with NM  $>14\%$  than  $\leq 4\%$ . The study presented herein evaluated the efficacy of IUI according to NM using strict criteria. The clinical PRs for first IUI cycles were 30.8% (28/91) for 0-4% normal forms, 26.5% (71/268) for range of 5-14%, and 20.8% (11/53) for  $>14\%$ . This study corroborates previous data with intercourse only suggesting that sperm with NM  $\leq 4\%$  using strict criteria are not necessarily associated with lower fecundity.

## Introduction

There are many studies that suggest that the 4% level using strict criteria for morphology separates fertile from subfertile sperm (1-5). However, not all studies agree on the clinical importance of measuring NM (6-7). One in vivo study found that with normal motile densities

(MD) there was a trend for higher pregnancy rates (PRs) when the strict morphology was  $>14\%$  compared to those  $\leq 4\%$  (6); however, in that same study, when MD was subnormal the group with  $\leq 4\%$  showed a trend for higher PRs than the group with  $>14\%$  NM (6). Thus this study which only evaluated pregnancies following intercourse and not intrauterine insemination (IUI), found that measuring sperm morphology using strict criteria was not particularly valuable in determining the fertility potential of a given semen sample (6).

The study presented here, attempted to corroborate or refute the aforementioned study only this time using IUI rather than intercourse as the method to try to achieve pregnancies.

## Materials and Methods

A retrospective evaluation of 412 first IUI cycles of 412 patients was performed. The reason for performing IUI may have been related to a subnormal semen specimen, poor post-coital test, or unexplained infertility. The sperm was processed as follows: Liquefied semen was diluted 1:1 with modified HTF medium (Irvine Scientific). 1 to 2 mL of gradient was placed in a 15mL conical centrifuge tube and overlaid with up to 2 mL of diluted semen. The columns were centrifuged for 20 minutes at 300xg. The upper semen layer was removed after centrifugation and discarded. Using a new pipet, the pellet was removed and washed 2 times for 5 minutes at 300 g using HTF. The final pellets were resuspended to 0.5 mL for insemination. The hypo-osmotic swelling test (HOST) was performed as previously described (8). The timing of the IUI was determined by having the patient begin urinary LH monitoring every 5 hours once the ovarian follicle size determined by pelvic sonography approached 17 mm and the serum estradiol level approached 200 pg/mL and then IUI would be performed approximately 40 hours later. Some patients taking follicle maturing drugs or having natural cycles but where the follicle was deemed mature without an LH surge as yet were given 10,000 units of human chorionic gonadotropin (hCG) and IUI performed 40 hours later. Only cases where oocyte release was documented by sonography prior to IUI were included.

Clinical PRs per IUI cycle were then determined according to the same subdivided groups described in the original manuscript based on intercourse (0-4%, 5-14%,  $>14\%$ ). A clinical pregnancy was defined by the demonstration of a gestational sac by sonography.

## Results

The clinical PR per IUI cycle was 30.8% (28/91) for those with normal strict morphology 0-4%, vs 26.5% (71/268) for those with a 5-

14% score, and 20.8% (11/53) for those with scores >14% (p=NS).

These results were not based on a greater number of motile sperm used for the IUI in the group with worst NM since this number increased with higher percentage NM as seen in Table 1.

Table 1

	NM 0-4% inclusive (n=91)	NM 5-14% inclusive (n=267)	NM >14% (n=53)
Total motile sperm in initial specimen (mil.)	(.24-373) 18.7	(.6-387) 36.0	(1.08-417.6) 79.5
Total motile sperm in specimen used for IUI	(0-35.28) 3.12	(0-88.40) 7.6	(.25-127.8) 16.6
Total motile sperm recovered	(.18-373) 13.4	(0-382) 27.6	(0-342) 50.6
% motile sperm recovered (mil)	(10-100%) 84.4	(17-100%) 79.0	(.1-76%) 76.1

### Conclusions

Similar to the previous study that evaluated the effects of percentage NM using strict criteria but following normal intercourse, as a generality, the existence of low percentage NM does not seem to lower fecundity. This does not mean that for some individuals that poor morphology does not result in a subfertile specimen. One way to assess this possibility would be to look at cumulative probability of pregnancy to see if failure to conceive following many IUI cycles may be related to poor morphology. With very respectable PRs following IUI with sperm with low morphology on the first cycle it would seem reasonable to try IUI before proceeding to IVF.

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