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May be Baby

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A new method of screening embryos reignites an old debate by sidestepping the ban on sex-determination tests

The Radiologist Peered into his ultrasound scanner and beamed. "Congratulations, "he announced. "It's a girl." Rajendra Jain could feel his heart sink. Two daughters already and now another on the way. He glanced furtively at the tiny human form on the monitor. Nineteen weeks old. Far too late to... Jain checked himself guiltily. Educated people didn't think about female foeticide, did they? The Jains had tried everything for a son: quacks, foul formulations, bizarre diets, even put up with relatives who coyly suggested they "do it" only on auspicious days. But nothing worked recalls this 39-year-old Marwari businessman from Calcutta.

After her third pregnancy, 35-year-old Meena Jain wrestled briefly with her conscience and terminated two others: both foetuses were female. By now, the couple was desperate. Then one morning in 1998 the Jains made a discreet visit to the Malpani Fertility Clinic in south Mumbai. On March 12, 1999, Meena delivered a healthy, six-pound baby boy. For the Jains that tiny creature was nothing short of a miracle. For Drs Anjali and Annirudh Malpani both well-known fertility specialists-it was yet another triumph over nature's inscrutable designs.

In any given semen sample, exactly half the sperm contain a Y chromosome, the microscopic strand of DNA that will eventually bear the prized possession of a male-dominated society: a son. The other half contain X chromosomes, which will result in a girl. Since both are equally populous, the probability of conceiving a child of either sex is 50:50. But probability is about numbers and statistics, not about personal choice and gender preference. Thus, whether a couple has a boy or a girl all boils down to pure chance.

Not any more. The method the Jains used to get a male child is known as Pre-implantation Genetic Diagnosis (PGD), a technique that marries the recent advances in molecular genetics with in-vitro fertilisation (IVF). Offered in only seven centres across the world. It represents the latest in cutting-edge technology normally used to detect chromosomal abnormalities like haemophilia and Down's syndrome. But in a country where technology is often used to terminate

female foetuses, the latest in science could become a social cause celebre: critics are saying it is unethical to "borrow" this method for the controversial purpose of gender selection. Although the Malpanis have successfully treated only one case so far, the procedure comes with a hefty price tag: Rs 1.5 lakh a go and no guarantees.

How is PGD done? First, the "pickup", where unfertilised eggs are collected from the ovaries. Then according to standard IVF procedure, they are fertilised in a petri dish with active sperm. Next, the growing embryos are carefully nurtured in an incubator until they are about three days old.

POINT "We use technology to terminate an unwanted Pregnancy. Why not use it to conceive a wanted child?" Dr. Annirudh Malpani, Fertility Specialist

After 72 hours, each eight-cell embryo-about the size of a pin point- is skillfully biopsied with the help of a micromanipulator, a powerful microscope with slender glass pipettes, with diameters roughly one-sixteenth the thickness of a single human hair. One of these pipettes firmly holds the embryo in place while the second delicately extricates a single cell from the little clump.

The extracted cell is then whisked away to the Malpanis' tiny FISH (fluo-rescent in situ hybridisation) laboratory, and transferred to a slide under a Stereo Zoom microscope, specially designed for single cell analysis. "The idea is to study its genetic blueprint to determine whether the embryo is male or female," explains Annirudh simply. The cell is first doused with two fluorescent probes: chemical stains that single out the X and Y-chromosomes from the intricate genetic masterplan. It is then "bathed" in a stainless steel water bath to wash away unwanted cellular debris that could interfere with the analysis. Freshly scrubbed Ms X shows up as a pink dot under a special fluorescent microscope, while Mr. Y reveals himself as a bright green speck. In the Jains' case, only two of the six embryos turned out to be male, these were then implanted in Meena's uterus while the remaining four pink "females" were simply discarded.

Scientific feat or sophisticated butchery? Like cloning and other controversial research in the fascinating field of molecular genetics, it all depends on your personal orientation. "Actually, separating X and Y sperm for gender selection is not new," says Dr Firuza Parikh, another well-known fertility specialist who runs a vastly successful IVT centre at Mumbai's Jaslok Hospital. Techniques like the Ericsson Method are widely available. A semen sample is soaked in a protein medium so the lighter Y sperm float to the surface; these are then "harvested" for artificial insemination. Although the technique costs just a fraction of PGD, its success rate is considerably lower. "However, PGD was originally designed to

screen embryos for congenital foetal disorders," adds Parikh. "Misusing it for gender selection is a dangerous trend."

Is it legal? While sex determination tests are banned in India, PGD neatly sidesteps the existing laws because, although fertilised in a laboratory, the embryos have not yet been "implanted" in a woman's body the method is "pre-conceptional" (that is, occurring before pregnancy is even established) and, therefore, not subject to government regulation.

COUNTERPOINT "The test was designed to screen embryos for congenital foetal disorders. Misusing it for gender selection is a dangerous trend."

However, PGD raises uncomfortable issues. "In a patriarchal society like ours, gender selection reinforces the traditional view that a good wife must necessarily produce a son," says Jean Da Cunha, sociologist and women's rights activist. In addition, gender selection can alter the balance in sex ratios and skew the demographics of a society, says population expert Malini Karkal. "It's like playing God."

The Malpanis disagree completely. "We use technology to determine when we will have children and how many. We also use it to terminate unwanted pregnancies, so why not use it to conceive a wanted child?" Besides, they point out, the PGD method is so expensive that the number of people actually opting for it will be statistically insignificant, so the question of altering demographics simply doesn't arise. Meanwhile, since it precludes conception altogether, PGD can help desperate couples who, like the Jains, would have otherwise resorted to traumatic illegal abortions of female foetuses.

On the flipside, it can also prey on their social vulnerability. "Every time a new method of gender selection is announced, I have a flood of women at my door begging for a son," confides a Mumbai gynaecologist privately. "Many are middle-class housewives who will sell everything they own to pay for the treatment. "

Is PGD really worth the sacrifice? Feroze Soonawala, a gynaecologist who has worked with a pioneering centre at London's Hammersmith Hospital, says the success rate of the procedure is modest at best. His estimate: "If you start with 10 eggs, only 75 percent will get fertilised in a laboratory. Once fertilised, nearly 25 percent eventually get damaged due to faulty lab conditions. Of those that survive, roughly half will be female embryos that need to be discarded. Eventually, most PGD procedures end up yielding barely two or three healthy male embryos. And if you are lucky, one may implant successfully in the uterus. If not, the entire cycle will have to be repeated."

In the West, where PGD is more available, it is used mainly as a genetic screening device and only rarely for sex determination. Moreover, if you have only sons, PGD can help you get a daughter. Moral? Technology is never unethical, only society can make it so.