

# TESTICULAR TEMPERATURE AND QUALITY ABSORBENT MATERIALS: COTTON VERSUS POLYESTER

## TESTICULAR TEMPERATURE CORRELATED WITH DIAPER QUALITY

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### Abstract: Aims & objectives

to analyse the possibility of a deleterious effect of the dampers/pampers on the testis development in babies.

The testicles are placed in the scrotum of all warm-blooded animals. This allows the local temperature to be lower than the central one. The temperature difference ensures the morphological and functional development of the testicles as well as the spermatogenesis. Instead of the classic cotton diapers, disposable polyester-based absorbents have recently been introduced (pampers, dampers). In the latter case, the local temperature is higher than that of cotton diapers.

The negative effect of polyester absorbents on testicular development has been demonstrated experimentally on a number of animals (dogs, rats, mice). In six children aged 8-12 months, who alternately wore polyester or cotton absorbents, it was found that the difference in temperature of scrotum versus rectum was lower by 0.5 degrees C in the case of those based on polyesters. In addition, some children developed local skin lesions that disappeared after switching to cotton diapers.

### Keywords :

*testis temperature, diapers, testis development*

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In all mammals, the testicles are placed outside the body, so that the temperature of the scrotum is lower than that of the internal abdominal organs, the difference being two to four degrees. This temperature is necessary for spermatogenesis and testosterone production. If this temperature difference is canceled out, in the postnatal period, spermatogenesis and testosterone secretion are diminished (Korman M. 1987). The cremaster muscle adapts the testicular temperature to the environmental one, lowering or raising the testicles inside the scrotum.

Embryologically, the testicles form near the kidneys, from where they descend, during the development of the embryo, in the lower abdomen, then through the inguinal canal into the scrotum, so that at birth they are already palpable in this subcutaneous sac.

***Testicular retention in the abdomen leads to testicular atrophy with depression of spermatogenesis and testosterone production.***

The obstetrician (neonatologist) has the obligation to check this. Testicular retention in the abdomen leads to testicular atrophy with depression of spermatogenesis and testosterone production. It also increases the risk of testicular cancer. At puberty, weight gain and testicular function are strongly boosted, under the influence of the onset of hormones of the anterior pituitary gland (FSH, LH).

In the case of varicocele (external or internal), although the testicles are in the scrotum, the local temperature is slightly higher and spermatogenesis is quantitatively and qualitatively depressed (changes in the shape, motility and vitality of sperm) which can lower the fertility.

A meta-analysis (Carlson E, et al. 1992) shows that, in the general population, sperm counts have halved in the last 50 years, while the prevalence of testicular cancer, hypospadias and cryptorchidism has increased.

Delayed puberty currently affects 2% of adolescents. One of the main causes of the above is the dramatic decrease in magnesium intake due to intensive farming techniques, irrigation, acid rain and food preparation (semi-processed), while magnesium losses have increased mainly due to stress involved in the way of life of modern man (Durlach 1988, Zeană 1989).

Maternal magnesium deficiency is also linked to Kallimann's syndrome (delayed puberty and anosmia). The almost universal use today of those disposable diapers, made mostly of plastic (polyester) does not seem to have no side effects in the male infants. Xenoestrogens are added to food that is altered in relation to the past food. The meat industry adds estrogen to poultry and veal (estrogenized animals to increase the mass of meat). Estrogens in food are almost completely absorbed into the infant's digestive tract and influence hormonal balance, especially in boys.

As a consequence of the increase in estrogen levels, there is an increase in cases of gynecomastia and adiposogenital syndrome in boys (Toppan, J. et al. 1996).

It is also possible that the testicles and epididymis suffer from the electrostatic field generated by polyesters (Shafik A.1993).

Depending on the material used to retain urine and feces expelled by the young child, there are significant differences in local temperature. The recto-scrotal temperature difference is lower in the case of disposables (pampers, nappies, diapers) than in the case of cotton diapers.

There is a close connection between the scrotal and the internal (testicular) temperature, the blood circulation cannot ensure a lower level of the testicular temperature (Coulter S.H., et al. 2001).

Fever lasting more than a day depresses spermatogenesis. Sitting on hot surfaces and obesity (which also involves peritesticular adiposity) depresses the genesis of sperm. For those who work a long time in high temperature environments, this can be a problem. Workers in foundries, ovens, possibly even cooks may be affected (Thonneau P et al. 1998, Oliva A., et al. 2001).

The optimal testicular temperature (31-36 degrees Celsius) ensures the normal synthesis of DNA and RNA, as well as the proteins necessary for sperm production. Winter temperature improves sperm quality. Physical activity and cold water have the same effect.

Instead, smoking and excessive alcohol consumption have negative effects.

Experimental research is entirely consistent in results: rising temperature is detrimental to the testicles.

In male rats, Pucak G., et al., clearly noted the negative effects of high temperature on testicular development and subsequent fertility.

Similar testicular alterations were found in mice exposed to a temperature of 43 degrees Celsius (Karnie and Lech): delayed testicular

descent, abnormal spermatogenesis, cytological and genetic alterations, infertility. In dogs that had their genitals covered with cotton material versus polyester for two years, there was a significant decrease in sperm count, sperm count, their mobility, and degenerative alterations on microscopic examination of biopsy fragments in the case of polyester. (Shafik A. 1993).

Investigating the difference in scrotal temperature in 6 children aged 8 to 12 months, measured in the morning, when these diapers and nappies are filled with warm urine, the difference in rectal versus scrotal temperature was 0.5 degrees Celsius, plus or minus 0.4 in the polyester case, while in the case of cotton nappies, the difference was one degree plus or minus 0.7.

It is assumed that cotton provides better heat dissipation, in addition to less perfect insulation, so that a degree of water evaporation is allowed. The polyester diaper caused local inflammatory lesions in some children, which healed quickly after using other cotton-based material (Fig.1).

## Discussions

In warm-blooded animals, the testicles occupy an anatomical position (in the scrotum) that allows a local temperature that is lower than the core/central body temperature.

This is a condition for the good morphological and functional development of the male gonads.

When the local temperature is higher, under different conditions, spermatogenesis and testicular hormone production are affected, which can lead to infertility or depressed sperm count.

The use of polyester materials for urine/feces collection may have negative effects on testicular development.

Reusable cotton diapers are preferable.



**Fig 1. Dermatitis related to the polyester pampers**

## Conclusion

The use of polyester-based disposable absorbents (pampers) in male infants is not recommended.

## Conflict of interest

The authors have no conflict of interest to make the declaration, had full access to all the data in the study and takes responsibility for the accuracy of the data analysis.

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