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*From the history of studies of touch*

Contact by touch, one of the strongest stimuli, difficult both to define and understand, is considered as the most primary, primitive, and therefore the oldest type of social behaviour (1, 6). This form of interpersonal communication has many meanings. It depends on such variables as: strength of pressure, intention by which the person who touches is guided, part of the body touched, relationship between two people and what movement has been performed (4). Many a time, touch is responsible for the feeling of safety, evoking trust, showing concern, willingness to provide assistance, and the provision of support. This may be related to the fact that the magnetic field of the hand is considerably stronger than the magnetic field of other parts of body, and that a human as a social creature needs contact by touch (3). From the physiological point of view, skilfully applied touch may lead to the decrease of arterial blood pressure, slowing of the heart rate, relaxation of muscles, facilitation of blood flow in vessels and lymph flow, acceleration of the excretion of toxic substances collected in muscles. It is also presumed that touch supports the production of endorphins in the central nervous system, which are a natural analgesic agent. One of the endorphins – enkephalin – reduces pain and induces a mood close to euphoria.

Sensitivity to touch develops already in intrauterine life, therefore from the earliest moments of life. In the human embryo the sense of touch begins to function as the first of the senses. This is the reason for sensory receptors being distributed on the skin, the largest and the most sensitive organ. In a developing embryo, the skin undergoes differentiation from the same layer of cells as the nervous system. Hence, it is capable of receiving such a large number of signals and responding to them.

OBJECTIVE AND METHODS

Human skin developing during the fetal stage of life, as well as the development of the nervous system, which exceeds the capacity of any computer in the world, provides humans with the capability of receiving an enormous amount of stimuli from the external environment. The possibility of making the optimum use of this gift is associated with the necessity to conduct comprehensive, detailed and long-term studies of touch.

The objective of the study is the presentation of the history of scientific studies of touch, carried out mainly in the USA, but also in Poland, with particular consideration of the importance of touch in obstetric care. In order to achieve this goal, the method of analysis of the available literature was applied, which concerned the most important studies of touch. This means that it was not planned to present all the studies performed, but only those considered as the most representative and most frequently quoted by people dealing with touch from both practical and theoretical aspects.

STUDIES ON ANIMALS

Due to the abundance of information carried by touch contact it is the most difficult of all the senses to investigate. The first studies on the sense of touch were conducted on rats in the first half of the 20<sup>th</sup> century, and on animals most similar to humans, i.e. prosimians and anthropoid apes.

In 1946, Spitz R.A. published a report in which he introduced the term 'anaclitic depression'. This concept was to explain the behaviour of infants separated from their mothers for prolonged periods. Subsequently, in the 50s, the studies were originated concerning monkey infants. These monkey infants were kept in separate cages as protection against infection. Attention was paid to the fact that the development of these infant monkeys was slower. Perhaps, a response to the results of the above-mentioned studies was a model research by Harlow, carried out on *Rhesus* monkeys. It was noted that monkey infants more willingly cuddled against soft materials (surrogate 'mothers' in the form of frames covered with plush fabric) than against the food dispenser. In addition, monkeys became emotionally attached to these soft surrogate mothers, and after separation responded with behavioural disorders (results published in 1963). However, earlier, already in 1962, there appeared a report by Harlow pertaining to sexual disorders in *Rhesus* monkeys bred in 'touch isolation' (5, 7).

Experiments by subsequent researchers were a continuation of the studies by Harlow. In 1984, a report was published by Suomi S.J. and Brown C.C., in which the authors indicated genetic preconditioning of behaviours associated with the lack of touch in primates. Meaney et al. (1985), while conducting studies on young rats in which short-duration touch was applied, observed that as adult animals they were more daring in the new environment, and in stress situations showed lower levels of stress hormones in blood.

Reports by Laudenslager et al. in 1986 concerned the amount of antibodies after exposure to antigen in monkeys separated from their mothers in the neonatal period. In these infant monkeys, the level of antigen was lower than in the control group. While investigating apes during the first year of life, the same researcher, in association with another team (1993), discovered that there was a relationship between time of contact by touch and the monkey's body response to tetanus antigen. In the years 1987 and 1991, there appeared again reports by Suomi S.J., which described abnormal patterns of behaviour observed in monkey infants as a result of touch deficiency. The study showed that such behaviours may become fixed and persevered even in the subsequent generations, unless monkeys are allowed contact with their mothers, siblings or older generation. Schanberg and Fidel (1988) showed a correlation between time of separation of a rat and its mother and biochemical processes such as: somatotrophin, i.e. growth hormone, activity (decreased) and the release of glyocorticosteroids (elevated). In 1989, Coe et al. published the conclusions pertaining to their studies of monkeys bred without mothers. They discovered that in monkeys separated from their parents in the first months of life, there occurred long-lasting immunity disorders. In the same year, a report by Fairbanks was published concerning the time which monkey mothers spend with their infants. It was noted that this depended on the amount of time which their own mothers spent with them. Higley and his research team carried out a slightly different experiment. He confirmed that in *Rhesus* monkeys bred without mothers there occurred a different body response in the form of stress reaction to different stimuli (5). It should be emphasized that the presented studies on primates allow us, to a certain degree, to conclude that the results obtained may also be related to humans.

#### STUDIES IN HUMANS

Due to the increasing interest of researchers in the application of various forms of touch in child care (practised for centuries by communities in Africa and Asia), the Touch Research Institute (TRI) was created at Miami Medical University. The task of this centre was to conduct studies mainly on the mechanisms of massage, effect of touch on the development of infants and older children and role of touch in developing bonds between parents.

In 1986, at the TRI, Field et al. carried out studies which showed that premature infants, in which a simple massage was applied 3 times daily for 15 minutes, gained weight by more than 47%, stayed in hospital by about 6 days shorter, and were more active, compared to non-massaged infants (2, 5). From the same source come the studies of 1992 which confirmed that massage decreases the symptoms of fear and depression in children and adolescents hospitalized due to the diagnosis of depression. Researchers from the TRI also established that massage applied to infants of mothers with depression decreased the level of cortisone in children's saliva; these infants also

fell asleep earlier as a result of massage than babies of the control group who were rocked in a cot. At the Institute, data was also published concerning the effects of massage in HIV carriers. In seropositive patients massaged for a month, 5 days a week for 45 minutes daily, a decrease in the level of anxiety was observed and an increase in the number of so-called 'killer cells'. In addition, HIV-positive infants who received massage obtained better outcomes in neurological studies. A relationship was confirmed between massaging the head of a premature infant and clearly decreased demand for oxygen (Acolet et al., 1993) (5).

Considering touch as an element of obstetrical practice, studies should be mentioned concerning the role of doula ('doula' – a Greek term with no equivalent in Polish) in perinatal care. Within the last 20 years in the United States it has become a practice that another woman constantly accompanies a woman at childbirth, whose task is to support the mother both physically and emotionally, and to provide her with all the necessary information concerning labour. This is a 'doula', which in Greek means a woman who helps another woman at childbirth (2). The doula's tasks with respect to physical support cover activities decreasing pain sensations (massage, pressing the sacral region), holding by the hand during contractions, assistance in changing body position. While investigating the role and usefulness of a doula during childbirth, and her effect on the course of labour, in the years 1986–1999, 12 randomised clinical studies were conducted in different places in the world, and the results were presented in 3 different mega analyses. These mega analyses sum up investigations in which similar hypotheses were adopted, and taking into account a large number of studies, enable arriving at a common conclusion. Some of the results may be presented as follows: • studies by Hodnett, Zhang et al. showed that the presence of a doula at childbirth results in a shorter duration of labour, an improvement of the state of a mother, and a smaller number of obstetrical interventions • Health Maintenance Organization emphasizes that physical support on the part of a doula decreases the need for epidural anaesthesia • mothers who delivered with a doula were more affectionate towards their infants, touched them more frequently (studies by Sosa et al.), the breastfeeding period was longer, and they more rarely suffered from postpartum depression (Wolman et al.) (7).

The method of 'kangaroo care', originally applied in order to provide the best care for premature and small infants, was also based on the therapeutic effect of touch. The programme of so-called 'kangaroo care' was implemented in 1979 in Columbia by doctors Edgar Rey Sanabria and Hektor Gomez Martinez to solve problems associated with frequent infections and high mortality rates in small infants, i.e. those with body weight too low in relation to their age. This programme has also, or perhaps primarily, become the method of care of premature babies. According to this method, the mother holds the infant against her abdomen (skin-to-skin), in a vertical position, face-to-face, between the breasts, in the way it can suckle without a problem. Due to the touch contact, skin-to-skin, the baby is warm, has a feeling of security (it hears the mother's heart rhythm), and is constantly surrounded by affection (2).

Based on the literature available, studies in Poland concerning conscious and purposeful application of touch (on a considerably smaller scale, compared to the studies conducted in the USA), were carried out in 1998 in the Independent Public Health Unit of the Regional Hospital in Bełżyce, with the participation of women at childbirth. The mothers were divided into two groups: Group I (experimental), where various forms of touch were applied during the first stage of labour, and Group II (control) – where intentional touch stimuli were not applied. Among the mothers of Group I, various types of massage were used in different positions during labour. In addition, they were informed about the purpose of these activities and massage techniques applied. Studies were conducted by the method of participant observation (Group I) and by a survey method (Group II). The results of the studies are self-explanatory: touch is an integral part of the work of a midwife, contributing to the development of contact between her and the mother. Additionally, properly applied massage techniques considerably shorten the duration of labour, even by 30%, decrease muscular tone, increase the feeling of safety of the mother and result in an improvement in her feeling of comfort (9).

In 2005, at two clinical hospitals in one of the largest cities in Poland, studies were also conducted concerning the demand of women at childbirth for touch on the part of persons who

were the closest, as well as midwives and obstetricians. The studies were carried out by the method of a diagnostic survey and covered a population of 100 women during the first 2–4 days after normal labour, hospitalized in maternity wards. The research material obtained enabled the following conclusions to be drawn: 1) during Stage I of labour, the respondents anticipated touch on the part of a midwife – 74.00% of the mothers examined, and on the part of a close person – 53 respondents, i.e. 94.64%; 2) at Stages II and III of labour, the respondents anticipated touch on the part of a midwife: at Stage II – 86.86% of mothers in the study, and at Stage III – 70.71%; 3) at Stage IV of labour: directly after childbirth the respondents anticipated contact by touch from the midwife (66.7%), and from a close person (96.43%); during procedures after labour, the respondents mentioned that they anticipated touch from the midwife (69.38%) and obstetrician – 63.63% (10).

#### RECAPITULATION

The beginnings of studies concerning the sense of touch go back to the 50s of the 20<sup>th</sup> century. These studies were conducted on rats, and on prosimians and anthropoid apes - animals which are most similar to humans. The conclusions drawn based on these studies were so interesting for the researchers that there appeared subsequent research projects, the objects of which were not only animals, but also humans. The research circles are familiar with the model studies by Harlow H.F., Schanberg S. and Field T., or by Suomi S.J. et al. It should be underlined that all scientific studies conducted in the area of contact by touch may be, and most frequently are, practically applied according to current needs. The presented study signalled some of these studies which may become a point of reference for more detailed investigations covering a larger population.

Both the studies by Harlow and those conducted by the TRI, or in Poland, evoke awareness of the significant role of touch in interpersonal relationships and care. The application of touch in the care of women at childbirth, premature infants, orphaned children or infants, as well as of HIV carriers, results in measurable benefits for both the person being touched and the one who is touching. The deficiency of this stimulus may lead to developmental disorders, inadequate responses to stress, decreased immunity or emotional coolness. Touch is an indispensable element in the life of humans and animals, and even today, there is nothing that could replace this type of contact which enables the perception of the world, of ourselves and of those who live near us.

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## SUMMARY

Contact by touch, one of the strongest stimuli, is considered as the most primary, primitive, and therefore the oldest type of social behaviour. This is a form of interpersonal communication which has many meanings. It is also a gift from nature, and the possibility to use this gift in an optimum way results in the necessity for comprehensive, detailed and long-term studies of touch. Due to a large amount of information associated with contact by touch, it is the most difficult of all the senses to investigate. The objective of the study is the presentation of the history of scientific research concerning the sense of touch, conducted mainly in the USA, and also in Poland, with a particular consideration of touch in medical care, including obstetric care. The first studies on the sense of touch were conducted on rats in the first half of the 20<sup>th</sup> century, and on animals which are the most similar to humans, i.e. prosimians and anthropoid apes. However, it was the study by Harlow carried out on infant *Rhesus* monkeys which constituted a starting point for subsequent investigations. It was observed that infant monkeys more willingly cuddled against soft materials (surrogate 'mothers' in the form of frames covered with plush fabric) than against the food dispenser. A conscious application of touch in interpersonal relationships and care of humans was also studied by Suomi S.J. and Brown C.C., Laudenslager et al., the Touch Research Institute, Health Maintenance Organization, Edgar Rey Sanabrie and Hektor Martinez Gomez. These studies indicated therapeutic, communicative, treatment and protective aspects of contact by touch. Studies were also carried out in Poland, and although of a local character, they clearly contributed to the establishment of the position of touch in the care of humans as an indispensable, irreplaceable element.

## Z historii badań nad dotykiem

Jednym z najsilniejszych bodźców, uważanych za najbardziej pierwotny, prymitywny, a tym samym najstarszy rodzaj zachowania w społeczeństwie, jest kontakt dotykowy. Jest on formą komunikacji międzyludzkiej posiadającą wiele znaczeń. Jest również darem natury, a możliwość jak najbardziej optymalnego wykorzystania tego daru niesie ze sobą konieczność wnikliwych, szczegółowych i długotrwałych badań nad dotykiem. Mnogość informacji, jakie niesie ze sobą kontakt dotykowy, powoduje, że spośród wszystkich zmysłów jest on najtrudniejszy do zbadania. Celem pracy jest chęć ukazania historii badań naukowych nad zmysłem dotyku, prowadzonych głównie w USA, ale i w Polsce, ze szczególnym zwróceniem uwagi na dotyk w opiece, w tym opiece położniczej. Badania nad dotykiem rozpoczęto w I połowie XX wieku badając szczury oraz najbardziej podobne do człowieka zwierzęta, czyli małpiatki i małpy czelkoksztaltne. Jednak to dopiero doświadczenie Harlowa na noworodkach małp rezus stało się punktem wyjścia do kolejnych badań. Okazało się, że małpie noworodki chętniej przytulały się do miękkich materiałów (zastępcze „matki” w postaci ram pokrytych pluszem) niż do przyrządu dostarczającego pokarm. Nad świadomym wykorzystaniem dotyku w relacjach międzyludzkich oraz w opiece nad człowiekiem zastanawiali się również Suomi oraz Brown, Laudenslager i wsp., Instytut Badań Dotyku w Miami, Health Maintenance Organization, Edgar Rey Sanabrie i Hektor Martinez Gomez, wskazując na terapeutyczne, komunikacyjne, lecznicze i ochronne aspekty tego kontaktu. Prowadzono także badania w Polsce i chociaż miały one charakter lokalny, to wyraźnie przyczyniły się do ugruntowania miejsca dotyku w opiece nad człowiekiem jako elementu niezastąpionego i koniecznego do jej sprawowania.