PAIN

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On the letterhead for this conference appears an apt quotation from Keats:

'Pleasure is oft a visitant
but pain clings cruelly to us'.

Allow me to say:

'From different times
and mental climes
came Milton and Keats
but sensitive each
to the deep barb of pain',

in order to quote the earlier Milton:

'A sense of pleasure
we may well spare of life perhaps
and not repine
but live with content
which is the calmest life.
But pain is perfect misery
the worst of evils,
and excessive
overturns all patience'.

The medical profession has always been under pressure to supply public explanations of the diseases with which it deals. On the other hand, it is an old characteristic of the profession to devise comprehensive and unifying theories on all sorts of medical problems. Both these statements apply to pain – one of the most important and clinically striking phenomena and expressions of man since his origin in the mists of time.

Need I emphasize the obvious that pain as such cannot be directly observed; what we do observe are persons claiming that, and/or behaving as though, they are in pain. What then is this pain? The definition I submit follows that of Engel[1] and that of Fabrega and Tyma:[2] Pain s an unpleasant perception which the individual explicitly refers to his body and which can represent a form of suffering. The emphasis is thus on perception, unpleasantness, and the link with the body of physical apparatus in order to distinguish pain from other unpleasant perceptions such as guilt, sadness, 'mental pain' and even nausea. Furthermore, the affective properties of pain in this instance feature more than the purely sensory properties.

Within the great diversity of human types, the way in which people will react, what they will say and how they will behave when experiencing this unpleasant sensation called pain, will vary considerably. What they say and how they behave are observable as the external accompaniments of the presumed internal state of pain; these are grouped and referred to as pain behaviour. There may be movement, involuntary and voluntary, and changes in demeanour and in facial expression. More important and helpful to us is what they say in attempting to describe and to qualify the pain experience. This is the linguistic dimension of pain, the pain language within the language usage of that person and the people to whom he belongs.

The response to and avoidance of noxious stimulation is an elemental factor in the adaptation of all living systems and thus also of man. We see pain as a warning and thus as a protective mechanism. Man's capacity for symbolization, however, introduces a different dimension to the problem. It is not only a central nervous system but also a mind in action: reading, interpreting and communicating about the body and its perceived state. With this added dimension it follows that culture and language are intimately and inextricably bound together with the communication of pain. Furthermore, to the extent that culture and language may actually affect perceptions, thought and cognition, they may also affect the actual experience of pain. One can thus repeat the question: to what extent is the response to pain neurologically programmed, and to what degree is it culturally programmed?

I shall touch upon certain dimensions of aspects of pain and group them into three phases: receptive, transmissive and perceptive, bridging soma and psyche. The numerous physicochemical stimuli activating the pain receptors to send forth the pain impulses are then

the bodily sources of pain. Together with the neurological and mental components they account for actual instances of pain. Let us consider briefly some features of the receptive and transmissive phases of pain.

PYNONTVANGS EN PYNOORDRAG

Oor die afgelope twee dekades is belangrike inligting bekom op drie gebiede verwant aan pynoordrag en die regulering of modulering daarvan: ten eerste, oor die aard en eienskappe van die neurone wat pynimpulse gelei; tweedens, oor die bestaan van omskrewe punte in die breinstam wat na elektriese prikkeling pynoordrag onderdruk; en derdens, oor die bestaan van 'n endogene analgesiestelsel deur middel van die eie produksie van opiaatagtige stowwe.

Betreffende die eerste gebied gaan ek terug na 1952 en na Rexed[3] se belangwekkende beskrywing en voorstel van die agterhoring as 'n asgerigte kolom van ses plate of laminae, elk bestaande uit selle met kenmerkende vorms en oriëntering. Etlike opvolgstudies kon hierdie voorstel bevestig. Die histologiese beeld en verskeidenheid van selle het ook aan 'n fisiologiese betekenis gewen, veral lamina I-selle wat selektief reageer op meganiese prikkels van hoë intensiteit, in teenstelling met, byvoorbeeld, die selle van lamina IV. Ons moet egter onthou dat die dendriete en aksone van hierdie neurone tot neurone in ander laminae en op en af in die grysstof deurstrek en sodoende hulle met mekaar verbind.

Met betrekking tot die tweede gebied, is die opstygende spinotalamusbaan klassiek bekend as die baan vir pynoordrag. Ons weet tans meer oor hoe sy vesels vanuit die vermelde laminae na gelang van die aard van die pynimpulse en drempelwaardes gerangskik is. Binne die anterolateerale kwadrant is daar, benewens die spinotalamusbaan, 'n spinoretikulumgroep, en volgens onlangse gegewens 'n spinoretikulumtalamusgroep as 'n belangrike alternatiewe baan vir pynoordrag.

Dalende vanuit die breinstam in die ventromediale medulla, veral die nucleus raphe magnus, en langs die dorsolaterale funikulus vloei vesels wat in die buurt van laminae I, II en V eindig. Deur middel van hierdie terugvloeibaan kan afferente pynimpulse vanuit die laminae gemoduleer word. Serotonien is miskien die oordragstof hierby betrokke. Die analgesie verkry met elektriese prikkeling op bepaalde punte in die breinstam is ten dele hierdeur te verklaar. Die gebruik van hierdie bevinding sal stellig in die kliniese terapie tot uiting kom, soos reeds met transkutane elektriese neuroprikkeling gebeur.

Die derde belangrike ontdekking van die endogene produksie van enkefaliene en endorfiene hou deels hiermee verband. Vyf peptiede wat biologies die werking van morfien naboots is reeds geïsoleer, nl. 2 pentapeptiede, t.w. metionien-enkefalien en leusien-enkefalien, en 3 endorfiene, beked as *a*-, *b*- en *y*-endorfiene. Daar is rede om te vermoed dat lipotropien die prohormoon is vir al 5 hierdie morfienmimetiese peptiede. Hierdie stowwe staan in verhouding tot die opiaatreseptore, groot molekule wat aan die op pervlak van neurone in bepaalde gebiede van die brein voorkom en wat selektief met opiumderivate reageer. Die hoogste sametrekking van opiaatreseptore by mense en ape blyk in die limbus te wees en die minste in die striatum. By ander diersoorte kom dit egter in laasgenoemde die meeste voor. Verder is daar 'n matige hoeveelheid in die middel-brein gevind, veral die grysstof langs die aqueductus; min daarvan kom in die harsingskors voor. Hoë konsentrasies van beide opiaatreseptor en leuenkefalien kom voor in die nucleus caudalis en in laminae I, II en V in die agterhoring. Dit wil verder voorkom asof daar 'n mate van ooreenkoms bestaan tussen die effektiewe punte vir opiaatingspuiting by proefdiere, die elektriese prikkelanalgesie, en hierdie verspreiding van opiaatreseptore en enkefalien. Dit wil ook blyk dat sistemies toegediende opiate hul analgesie verwek deur inwerking op hierdie endogene breinstamsisteem. Geleidelik dus verskyn die beeld van 'n ingeboude pyndempende meganisme vir die beheer oor pyngewaarwording en dus ook waarneembare pyngedrag.

Naas hierdie anatomies-fisiologiese dimensie van pynontvangs en pynoordrag, het pyn ook 'n abstrakte, konseptuele dimensie. Ons praat dan oor die pyn, terwyl ons nie in die pyn verkeer nie. Ons praat oor die begrip pyn op 'n vlak wat 'n sterk mate van eenvormigheid inhou.

LINGUÏSTIESE DIMENSIE

Deur die eeue is die kort woordjie pyn in die mond van die mensdom geslyp en trag dit uiting te gee aan sy gemoed, diep gesetel in die verre en vae geheue van millennia van ervaring as 'n wesenlike en onafskeibare komponent van menswees. Aan hierdie klein woordkapstok hang inderdaad 'n groot mantel van ervaring.

Soos die digters en denkers wat hul beelde uit woorde wil beitel en hulle dus eers deeglik betrag en oorweeg, moet ek ook eers verwyl by ons sleutelwoord: pyn. Aanvaar ek die omskrywing van pyn as 'n onaangename gewaarwording wat die persoon uitdruklik na sy liggaam verwys en wat 'n vorm van lyding kan verteenwoordig, dan het die mensdom in al sy verskeidenheid stellig altyd getrag om in 'n woord of in woorde daaraan uiting te gee. Ons woord se penwortel gaan ver terug na die klassieke Grieks waarin *poine* die woord vir straf of boete was. In hierdie oerverband en betekenis – en onthou die klassieke Grieks het ook baie oorgeneem en verwerk uit die groot voorafgaande kulture – is die woord gekoppel aan oortreding, die gereg, en strafbepaling. Hier het die *poine* of straf/boete die hele mens, in psige en in soma, getref. Dit is onseker of die opkoms van die Christendom die betekenis laat verskuif het na die persoonlike ongerief, d.w.s. 'n toestand vandie mens. Hierdie ou verband bestaan nog in ons taalgebruik, beide in Afrikaans en in Engels, soos in die volgende sinne: 'Waarom moet jy my so pynig (straf) met hierdie verhale', of 'I don't know why she feels she must punish (pain) me in this way'.

When Latin took over as culture medium, it also took over many Greek words with their implicit meanings. In classical Latin we thus find *poine* becoming *poena,* still

conveying the concept of penalty but shifting in late Latin to *pena,* with as overtone 'punishment of hell'. From this arose the West-Germantic *pinon,* meaning to inflict suffering, from whence the old Dutch and old English forms arose. Also based on this late Latin *pena,* old French coined the word *peine* and the verb *pener,* root words which the conquering Normans added to the English language. Some of the old forms are still in use, such as the word 'pine', interestingly bridging the mind-body division in 'He pines (pains) for her'.

Attempts to express pain as an unpleasant perception were not, however, limited to the one word, although pain, in our culture and in clinical medicine, perhaps is the principle vehicle. Three other terms have been and are still in use in attempting to express this gripping multifacetted human experience. All three are West-Germanic in origin and are intimately interwoven with our common cultural expressions. In English they are 'ache', 'hurt' and 'sore'.

'Ache', from the original Germanic *akan,* gave expression to bodily discomfort of a severe nature, in addition to the old Greek concept of penalty. By 1250 it referred more to older and persisting pain. Again we still have the bridging of the mind-body division in 'My heart aches for her' as an expression of sympathy or of yearning. In Afrikaans we would say: 'Ek het medelye met haar'.

The term 'hurt' is a derivation from the original word which meant a physical blow. It originally did not connote injury, pain or suffering, but gradually acquired this meaning, clearly linked to the body but also extended to the psyche, e.g.: 'I felt hurt by what you said'. 'Sore' is probably the oldest term for pain in proto-Germanic which is still in use. From its earliest documented uses the base form was related to intense and severe pain, in clear contrast to its current meaning in English. In Afrikaans 'baie seer' can still mean severe pain. Sore and sorry are etymologically related: 'I feel sorry for you' can mean 'sore on your behalf'.

In Afrikaans word, naas pyn, drie ander terme ook gebruik. 'Smart' uit die Oud-Germaanse wortel vir byt, dra tans sowel fisiese as geestelike konnotasies. In moderne Duits is *Schmerz* nog die belangrikste woord om die onaangename gewaarwording oor te dra. Hiernaas bestaan ook *Pein.*

'Skryn' gaan terug na 'n Oud-Germaanse woord vir sny en dra vandag nog die betekenis van skerp, snydend of brandend. Verder is daar 'weë' soos in barensweë, maar ook die geestelike komponent soos in heimweë.

Óm hierdie paar woorde het ons Westerse voorouers met moeite gepoog om uitdrukking te gee aan dit wat hulle in hoofsaak liggaamlike leed aangedoen het. Die woord op sigself was dikwels ontoereikend, sodat ander woorde en selfs metafore in die tweede en derde linie bygehaal is om die gewaarwording verder te omskryf. Ons vra uit en die pasiënt kan die pyn tuisbring by 'n streek, bv. die buik of die been, of selfs 'n orgaan, soos die oog of die oor, of kan dit koppel aan 'n liggaamsfunksie soos sluk, hoes of urineer. Benewens hierdie orgaan- of funksiekoppeling, is daar al 102 pynbeskrywende byvoeglike naamwoorde opgeteken[4] en kon ek 96 pynbenamings in mediese woordeboeke opspoor. Stellig benodig ons 'n nog ryker semantiese skat by ons pasiënt om deur hul genuanseerde beskrywings gouer op die diagnostiese spoor te kom, beter te kan onderskei, en vergelykings te kan tref om pyn as verskynsel beter te beoordeel. Hoe ryker en raker die beskrywing en hoe fyner ons luister na die pyntaal, hoe gouer sal ons spoorvat.

In a recent study Bailey and Davidson[3] (from Montreal and Vancouver) analysed 39 pain adjectives in a series of 183 patients and could relate them to either sensory, affective or evaluative factors. They found that understanding pain intensity at the level of verbal self-report requires that the health professional shifts his attention away from the sensory aspects of the experience and attends more to the affective components of that experience. We have therefore to grasp and use this language of pain better. The physician must know words as he knows his other instruments, their history, the essence of their meaning and their proper use.

These linguistic and symbolic aspects are clear pointers to the fact that the concept of pain in clinical practice involves much more than its somatic base. One has to stress the multifacetted nature of the human pain experience, a result of many variables which coalesce to create the chief complaint. The physician who assesses any complaint of pain must always therefore keep in mind the various levels; the biological and organic bases together with the overlay of the modifying aspects of an individual's cultural, social and even own intrapsychic meanings. The middle-aged man concerned about a vague chest pain and whose friend has just had a myocardial infarction will tend to focus on that meaning of his pain. It is not uncommon for an athlete to complete an entire sports event with a sprained ankle or minor fracture, noticing only after the contest that he has severe pain. Larrey, the great surgeon in Napoleon's army, performed amputations under battle stress while the patient looked on.

Attention can greatly alter one's response to pain. In the focalized attention of hypnosis individuals can often tolerate severe pain. Children engaged in fantasties such as an imaginary cartoon, can tolerate painful suturing procedures. On the other hand, anxiety and depression tend to exacerbate the pain sensation. Fear, dread, helplessness and powerlessness can be evoked by pain and, in reverse, by colouring the patient's perception, can increase his suffering considerably.

TOTAL PAIN

This leads to a concept which also needs attention, namely that pain, particularly chronic pain, can destroy the personality. Leriche, the well-known author of the Leriche syndrome, was an astute observer of pain in his book *La Chirurgie de la Douleur* (1940). I quote my free translation: 'Pain is always a sinister gift which diminishes the human being' Joann Eland[4], a nurse and assistant professor of nursing, in describing her own experience, says: 'Without wanting to sound over dramatic, I can honestly say that the world of chronic

pain is truly a living hell when, little by little, people are destroyed until they hardly recognize their former selves. One of the first things a person with chronic pain learns is that his expressions of pain, which initially follow the acute model, are now no longer acceptable'. The person will then gradually and consciously change his pain behaviour. Such pain includes not only the physical distress, but also the emotional and mental suffering, the social problems which arise, and the spiritual need for understanding and security. This is the concept of total pain, the pain that is so hard to describe and so different from the pain event. To grasp this thoroughly, the doctor must always listen and listen patiently. For patients with chronic pain, pain clinics and pain centres as well as special in-patient care are becoming part of the modern medical scene.

Let us also be aware of the pain-prone patients compared with patients with organic pain. Self-esteem scores for pain-prone patients are significantly lower than those for patients with organic pain. And then, on the reverse of the coin, there are conditions in which pain does not exist. In congenital analgesia the subjects perceive pain, but because of cerebral effects, are indifferent to it. In congenital insensitivity to pain, defects are present in peripheral nerves, in the laminae and/or the dorsolateral fasciculus disrupting the transmissive phase.

PYNBESTRYDING

Die moderne mens sien in pyn 'n onaangename aantasting wat soveel as moontlik bestry moet word en stel dus steeds die pragmatiese eis: 'Hoe kan u my pyn verlig?' Hierin het die geneeskunde as bevoegde instansie reeds heelwat bereik. Tot sy beskikking vir gepaste gebruik is daar 'n reeks stowwe verwerk tot 'n verskeidenheid preparate met ongeveer 800 gelyste ligtere analgetika (4 groepe met derivate van salisiel, anilien, antranielsuur en pirasool) en 175 gelyste narkotiese analgetika. Aan laasgenoemde kleef die meerdere of mindere gevaar van afhanklikheidsvorming, rede dus vir die Medisynebeheerraad om hulle so veilig moontlik in die hoogste bylaes te plaas.

KULTURELE NEWEWERKING

Ek sal nie die kulturele newewerkinge bespreek nie, maar wil slegs wys op 'n kulturele newewerking van hierdie beskikbare terapeutiese armamentarium in die moderne gemeenskap. Dit is waarneembaar in 'n veranderde houding teenoor pyn; daar het 'n algofobie of pynvrees ontstaan. Dit lei tot kleinserigheid tydens blootstelling aan die alledaagse prikkels, alhoewel ons tog kan verwag dat die gesonde mens liggaamlik 'n mate van pyn en psigies 'n mate van angs kan verduur. Die moderne gejaagde mens erger hom oor baie dinge wat vroeër gelate aanvaar is. In die kinderlewe vervul pyn 'n opvoedingsfunksie deur huil uit te lok en daarmee die persoonlikheid op te wek. Later, wanneer hy nie meer hoef te huil nie, leer dit hom verman. Die opvoeder lok die verset teen huil uit wat tot op sekere hoogte opvoedkundig juis is, om in die kind se eie belang 'n mate van ongemak en ontbering in die lewe te verdra. Hierin het die Spartane miskien te ver gegaan.

By 'n matelose algofobie, daarenteen, word dit self 'n kwelling en verwek dit 'n kleinmoedigheid naas die kleinserigheid, wat 'n volwaardige volwassenheid ondermyn. Wie nooit pyn geken en verduur het nie, mis die drang om daaroor na te dink en mis ook een van die noodsaaklikste gewaarwordinge van medemenslikheid. As 'n onuitwykbare ervaring in menswees vervul pyn dus enersyds in die liggaam 'n waarskuwende en dus beskermende funksie, en andersyds vir die psige en persoonlikheid 'n wesenlike vormende funksie.

Ons besin dus oor 'n probleem wat veel verder strek as wat die somaties gerigte definisie sou laat vermoed – in die definisie egter was die woord 'lyding' ons lanseerpunt na die verdere dimensie. Dit is 'n probleem wat van die oudheid af in eerbied en ontroering gestel is; die mens-in-pyn, waar natuur en kultuur verbind is in die konkrete persoonlike bestaan. Dit handel steeds oor die gehele mens in sy binding aan norme en wette, en sy sedelike en godsdienstige beginsels; dit handel uiteindelik oor sy kwesbaarheid na liggaam en na siel.

Digters was nog altyd die begenadigdes om die roersele van die mensegees aan te voel en te vertolk.

Ten aanvang was Milton en Keats aan die woord, ten slotte N.P. van Wyk Louw[7]:

'Dat pyn bestaan, is nodig, Heer,
sodat U aarde vol kan vloei
van rykheid, en die soet geduld
óók aan U vreemde boom kan bloei.
Maar gee in óns die lot van smart
tot aan die einde van U dae;
laat daar aan ons gepynig word,
maar ons nooit pyn maak nie of klae'.

References
1. Engel, G.L. *in* Macbryde, C.M. and Blacklow, R. S., eds (1970): *Pain in Signs and Symptoms.* Philadelphia: Lippincott.
2. Fabrega, H. and Tyma, S. (1976): Brit. J. med. Psychol., 49, 349.
3. Rexed, B. (1952): J. comp. Neurol., 96, 415.
4. Melzack, R. and Torgerson, W.S. (1971): Anesthesiology, 34, 50.
5. Bailey, C.A. and Davidson P.O. (1976): Pain, 2, 319.
6. Eland, J. (1978): Nursing Outlook, p. 430.
7. Louw, N.P. van Wyk (1954): *Nuwe Verse* Kaapstad: Nasionale Boekhandel.