SOME OBSERVATIONS ON HEADACHE AND EYE PAIN IN A GROUP OF SCHOOLCHILDREN

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At all ages headache is often a difficult symptom to understand. The frequency and variety of headache in children of different ages and in different communities have not been widely studied or well described. The comments of current textbooks lead essentially to two conflicting conclusions: either that headaches are uncommon and arise in the main from definite organic disease (Holt and McIntosh, 1940; Mitchell and Nelson, 1950, p. 1125) or they are frequent (Brennemann, 1945; Mitchell and Nelson, 1950, p. 1153; Parsons and Barling, 1954) and have a wide variety of causes. The explanations given in this second approach invariably include, in addition to organic disease of the brain, refractive errors and chronic upper respiratory infection, especially sinusitis and, with less precision, eyestrain, fatigue, anxiety, and tension.

It is accepted that migraine can begin in childhood, but it is generally placed in a special category. The definitions of migraine vary, and once the strict picture of a largely familial affliction with paroxysmal hemi-crania, scotomata, and nausea or vomiting is abandoned we meet descriptions in which headache is only one of a variety of recurrent symptoms. After reading these accounts we are left with the impression that headache in childhood has not been studied with the precision that its frequency deserves, and that traditional explanations largely unsupported by facts still colour the thinking of many doctors about this problem.

This paper makes no attempt to review all the types and causes of headache in childhood. We want to draw attention to the headache and eye pain related to tender areas in the posterior neck muscles, and to describe their frequency among a group of schoolchildren in this area. Our understanding is still too incomplete for a nicely rounded account of the condition, and so we shall describe our observations and reflections as they arose.

At the age of 13 years one of us (E. L. H.) experienced an attack of severe pain in one eye, which was ascribed at the time to an error of refraction. The same pain was experienced many years later during an attack of "fibrositis" of the neck, and in this attack deep palpation at a particular point reproduced the eye pain, relief being obtained by massage and heat. At this time, in the course of routine examinations of schoolchildren, several were referred by teachers or parents complaining of eye pain or headache for which no cause in the eyes or upper respiratory tract could be found. The personal experience quoted suggested that palpation of the neck might be informative, and it was found that in a number of children the eye pain or frontal headache could be reproduced by this procedure.

It is well known that occipital pain can be produced by palpation in the upper trapezius and along the nuchal line. The eye pain, however, was limited to reference from a particular small area which was so constant that it was at first regarded as the trigger-point. This lay about one inch down the posterior border of the sternomastoid. Deep pressure here reproduced the eye pain, on the same side, in some children subject to spontaneous attacks, but not in normal children. It was then found that the trigger-point could be detected more readily if the child relaxed the posterior cervical muscles, allowing the head to fall back against the examiner's hand. Finally, in one very thin and relaxed girl a bony point was identified, and found to be the tip of the first cervical transverse process (called the first C.T.P. tip). Thereafter the palpation was done with the thumb and finger of the right hand, the child being told to "let your head flop back." It was clear from examination of subsequent cases that the tender spot reproducing the eye pain was in nearly every case the first C.T.P. tip. It was also found extremely difficult to palpate this in boys and girls who had passed puberty; indeed, in boys of that age we have not been able to identify this point with certainty, as the neck in both boys and girls past puberty feels much thicker and more muscular.

In palpating the tip the pressure made by the thumb and third finger was inwards, and, although in a few cases there appeared to be a tender thickening over the tip, in most this was either too tender to palpate or the thickening was not identified with certainty.

We have records of 189 cases of headache or eye pain. In 47 of these the pain could be reproduced in the manner described. In 38 others the first C.T.P. tip was very tender, but reproduction of the pain was not obtained. The second group, however, appeared to be essentially similar, and our observations in this paper are based on these 85 cases. The observations were made during a period of two and a half years, and the children were all seen originally in school.

Clinical Picture

The general picture was of an anxious mother and child complaining of "bad heads." On questioning, these were often described by the child as pain in one eye or one side of the brow, rather than as headache (see Table I), though headache was the word generally used by the mother. These pains were often incapacitating, causing the child to stop what he was doing, to "go white," cry, sit or lie down, and occasionally to be sent home from school. In some cases blurred vision was complained of, "as if a sheet of glass was in front of the eyes" or "little dazzy lines." Other children vomited or felt sick. Some complained of giddiness. A few others complained at times of pain elsewhere—neck, back, legs, or abdomen.

The pain lasted for a variable time, from half an hour to most of the day. The child usually took aspirin or "slept it off." The family doctor had usually been consulted, and some children had seen ophthalmologists or opticians. In some cases glasses had been prescribed, with no improvement. The length of history varied from a few weeks to seven years.

The onset of the pain was often stated to be due to reading, to going to the pictures, to running about, to netball, or to "heading the ball" at football. On questioning, one usually found that the posture in reading was such that the body was supported on one elbow, or the child sat with legs curled up and the head flexed on one shoulder. It seemed possible that some of the cases of headache at the pictures might be related to the tense attitude of head

and neck while watching an exciting film. In other children there seemed to be a clear relationship to anxiety—for example, over starting school, working for the grading examination, etc. In some, however, no clear associations were found. Table I gives the frequency of complaints in the 85 affected children.

TABLE I.—*Variety of Symptoms and Behaviour in 85 Children with Headache or Eye Pain*

Pain in the eye	28 cases
Pain in the frontal or temple region	11 "
Headache	46 "
Giddiness	8 "
Nausea or vomiting	7 "
Blurred vision	8 "
Pain elsewhere (neck, back, legs, abdomen)	5 "
Cried with pain	21 "
Lay down during attack	14 "
Sent home from school	3 "

Unfortunately the situation of the pain was not recorded exactly in the earliest cases, but Table II gives the main sites.

TABLE II.—*Location of Pain in 85 Children with Headache or Eye Pain*

Right side only	10
Left "	12
Right side and occasionally bilateral	2
Left "	3
One side, alternating	2
Over or between eyes	11
Frontal	17
Vertex or occiput	2
Unrecorded or uncertain	26

There was no evidence of hypertension or raised intracranial pressure in any of the children, nor were abnormalities or disease of the eyes or upper respiratory tract present, except in three cases; in two of these errors of refraction appeared to be an important factor and in one an upper respiratory condition was relieved after removal of tonsils and adenoids.

Treatment

We have approached treatment in the following way. When the child was first seen at school ample time was spent in getting a full history and if necessary a special appointment was made. During the interview we were often impressed by the mother's evident relief that the story of headaches was being taken seriously, and at the suggestion that they could be explained and relieved.

The child was then taught relaxation exercises for the head and neck. In order to steady the shoulder girdle the child was told to stand leaning forward a little with his hands resting on a chair or table low enough to enable the arms to be vertical and rigid. While leaning on the hands in this position the head can easily be flexed, extended, and rotated without moving the shoulder girdle. The child was then told to "flop your head backwards and forwards as if it is loose on a pin and then round and round." In some cases the mother was instructed to rub, with or without oil, the area over the "trigger-point" to help the relaxation. These exercises were to be done every night, and also if a headache threatened.

It was left to parent and child how long the exercises were to be done. Usually this was for five to ten minutes nightly, and they were kept up regularly for two to three weeks, when, if there were no symptoms, they were discontinued.

A number of the children were referred to hospital, where the findings were confirmed. In a few cases x-ray examination or electroencephalography was carried out, with negative findings. Where confidence had not been easily established physiotherapy was arranged at the hospital department.

The children were seen again at school, some within a month, but the majority six months later; and were followed up at intervals for one or two years. Table III shows the subsequent findings. The children noted as improved no longer complained of headaches, and had lost the extreme tenderness of the first C.T.P. tip, though occasionally slight tenderness remained.

TABLE III.—*Follow-up of 85 Children with Headache and Eye Pain*

Treated:	
Improvement within 2 weeks	10 cases
" " from 3 to 24 weeks	47 "
" " " 6 to 12 months	5 "
Left school—reported by parent much improved	2 "
Not improved	10 "
Not treated:	
Improved	2 "
Not improved	1 "
No information	8 "

We are concerned to assess the value of these exercises. We had no control series, but noted in school medical reports that some children who were reported as having this syndrome in the past had now cleared up without treatment, though this generally took months or years. Children often spontaneously spoke of being able to deal with the headache by the exercises. The following case histories illustrate the picture.

Illustrative Cases

Headache or Eye Pain Referred from the Neck.—A boy aged 14 had had violent headache since the age of 7. He was first seen at the age of 10, when nothing could be found to account for it. The headache came on at the pictures when he sat in front. He did not get it when he sat at the back. He also had it at early church services and had to be taken off serving at the altar because of this. He also had the headache at school about twice a week. The head teacher described them as "violent headaches." The pain, as distinct from headache, was felt behind both eyes. Tender areas and small nodules were found on both sides of the neck in the trapezius. The left retro-orbital pain was reproduced by palpation over the left first C.T.P. tip. The patient was a big strong boy, who held his head rather forward. Neck movements appeared full. His vision was normal without glasses. He had, however, obtained glasses through an optician about a month previously and wore them for reading and the pictures. They made no difference to the headaches. He was taught the exercises and a month later he was quite free of headaches and there were no tender areas. Six months later he had remained well apart from an odd headache. Two years later he was well with only a very occasional headache. He had then left school and was working.

Associated Anxiety and Defective Posture.—A boy aged 5½ complained of headaches when he first attended school in October, six months previously. He used to go home and cry and say he had a bad head. His mother gave him hot drinks and aspirin, and it went off within the hour. He had always been a very "self-conscious" child and did not like going to school. The headaches went on for about two months, but he has had none since. In the following February, on a doctor's advice, he was seen by an ophthalmologist, who found a very minor refractive error. He was ordered glasses for reading but refused to wear them. By April, when examined at school, there had been no headaches for three or four months, but his mother was still worried about them. He was a very anxious-looking child with a rather stooping posture. When his neck was being palpated he complained of pain at several points, and then suddenly exclaimed, "That's my headache," when the right first C.T.P. tip was palpated. He was taught relaxation exercises, and his mother afterwards said that "he did these thoroughly for half an hour each night for two weeks." He then went away to his granny for six weeks and on return was free of headaches, and no tender areas were palpated. Follow-up at intervals for a further eight months confirmed that the headaches did not recur. He retained the stooping posture for some time; but that is now improved and he no longer looks anxious.

Headache and Neck Tenderness but Without Referral of Pain.—A girl aged 14 complained of attacks of pain at the back of and above the eye, and down the side of the face, usually one side or the other, occasionally both sides. She also complained of thumping pain at the back

of the head. The attacks occurred once a week and were formerly accompanied by vomiting. Little blotches appeared in front of the eyes when she had the pain. Sleeping in a darkened room for about five hours relieved it. Her mother, maternal grandmother, and aunt all have migraine, and the mother had diagnosed it in the patient from the age of about 3 years. Tenderness was present over both first C.T.P. tips; the pain was referred up the back of the head but not to the eyes. She was seen at hospital and physiotherapy was arranged. When seen three months later she had had only two headaches, and these were less severe than formerly; there was no vomiting or disturbance of vision with either; slight tenderness was present over both first C.T.P. tips, but there was no reference of pain to the back of the head. In the next six months she had had one attack. After a further six months she had had only one attack, and this occurred during an examination. Her neck was not tender at all. Four months later she had had one headache during an examination. Her mother was delighted with her progress.

Incidence of Headache in the School Population

The majority of severe cases were specially referred either by the head teacher, because of the interruption to school work or play, or by the parent at the school medical examination.

In order to estimate the incidence of headaches in an unselected sample the question, "Is there any complaint of headache?" was asked of the mother of every 5-year-old child seen at routine examinations, and of the mother or, in her absence, of the child itself at the examinations at the ages of 10-11 and 14. Headaches were classed as severe if they reduced the child to tears or to bed; and as mild if they happened "at odd times" and did not interfere with activity.

The first C.T.P. tips were palpated in the manner described in just over 3,800 children. If the child winced on palpation the tip was classed as "very tender." If he said it hurt, other bony points were palpated and his reactions noted. If he persisted on saying that the first C.T.P. tip hurt on palpation when other bony points did not hurt, it was classed as "slightly tender." The findings are shown in Tables IV and V. The 14-year group is of

than in the other groups; mild headaches were commonest in the 10-year group. There was no absolute correlation between the degree of neck tenderness and the severity of the headache, but the following facts emerge: severe tenderness never occurred without a complaint of headache; slight tenderness was found in some children where no complaint was made; a few children had severe headaches without tenderness over the first C.T.P.

Discussion

In no current textbook of paediatrics can we find any description of the type of headache reported here. There is, however, considerable clinical and experimental support in adults for the picture we have described. Gordon Holmes (1913) refers to indurative or rheumatic headache, acute bouts of which may simulate migraine, and says: "In some cases the tenderness is greater over the transverse processes and spines of the cervical vertebrae." Patrick (1918) describes headache originating in the cervical region, radiating upwards and to the frontal regions. He noted that often there was pain on movement of the head, aggravated by cold, increased by stooping, straining, and coughing, generally by physical exertion, and rather rarely by jolting or jarring; it was frequently increased by mental application.

It does not appear that the first C.T.P. tip has itself been identified as a trigger-point in adults, although "trigger areas" over it have been found (Kelly, 1942). Kelly reported on 40 cases of headache in adults successfully treated by infiltration of tender areas in the neck muscles with a local analgesic. He states: "The more definite the complaint of pain as such, the more likely is a muscular lesion to be found. In addition to pain, giddiness is a common complaint." He found that lesions "situated deeply in the suboccipital region often cause no local pain whatever, being referred wholly to the frontal region or to the orbit." One of the tender spots described by him appears to be identical with the surface marking of the first C.T.P. tip.

Josey (1949) reports on patients with frontal and occipital headaches in whom at times the frontal headache was so predominant that only after direct questioning was any painful symptom referred to the occipital region or neck. He found that in nearly all cases "firm pressure with the examiner's thumb just lateral to the body of the second cervical vertebra produced pain locally, and also a radiating pain which was described as shooting, through the head to frontal or supraorbital region."

These headaches have also been investigated experimentally. Kellgren (1938), working with Sir Thomas Lewis in a systematic examination of pain arising from muscle and referred to a distance, injected 0.1 ml. of 6% NaCl into the small muscles of the suboccipital triangle and found that this gave rise to pain felt deeply in the head, which was described as headache. Kellgren (1939) considered that in general the distribution of the pain, and whether it was local or segmental, appeared to depend more on the depth at which the tissue was stimulated than on its nature, whether muscle, ligament, or periosteum.

Campbell and Parsons (1944), following the methods of Lewis and Kellgren, studied 40 patients by injecting small amounts of 6% saline in the basioccipital region. In the majority they were satisfied that they stimulated the periosteum of the occipital condyle or adjacent base of skull. Head pain produced by these methods resembled the symptomatic pain of clinical experience so accurately that patients would exclaim, "That's it!" "You've hit it." From the condyle or basal region the pain was predominantly orbital and frontal. Procaine hydrochloride infiltration of trigger spots relieved the pain at least temporarily.

The relationship of basioccipital lesions to orbital and frontal pain is very difficult to understand. Campbell and Parsons explain it by embryological relationships, and point out that there are wide differences between dermatomal and

TABLE IV.—Incidence of Headache in Schoolchildren

Boys and Girls	Total	Complaining of Headache					
		Severe		Mild		Total	
		No	%	No	%	No	%
5 years	1,721	4	0.2	48	2.8	52	3
10 "	969	18	1.9	151	15.6	169	17.5
14 "	1,002	15	1.5	108	10.8	123	12.3
Grammar-school girls 16 years	119	6	5.0	11	9.2	17	14.2

TABLE V.—Incidence of 1st C.T.P. Tenderness in Schoolchildren

Boys and Girls	Total	On Examination of 1st C.T.P. Tip					
		Very Tender		Slightly Tender		Total	
		No	%	No	%	No	%
5 years	1,721	2	0.1	56	3.3	58	3.4
10 "	969	4	0.4	107	11.0	111	11.4
14 "	1,002	11	1.1	115	11.5	126	12.6
Grammar-school girls, 16 years	119	1	0.8	7	5.9	8	6.7

modern-school boys and girls. The grammar-school group consisted of girls only, and the numbers here are very small.

It is clear from Tables IV and V that the first C.T.P. tip is free from tenderness in nearly 90% of 10- and 14-year-old children. Complaints of severe headache were more common in the small group of grammar-school girls

sclerotomal pain in the head and neck. They also point out that the spinal tract of the fifth cranial nerve descends to the second cervical level or below. This may be important, for with its spinal connexions a possible pathway exists for reference of pain to the orbit.

It has also been pointed out to us that the small muscles of the suboccipital triangle, which take origin from the first cervical transverse process, and which are so important in balancing the head on the neck, are supplied by the posterior division of the first spinal nerve (which does not supply any structures near the surface of the body). The sternomastoid and trapezius, like the small muscles of the suboccipital triangle, also receive some exclusively deep innervation through the bulbar fibres of the accessory nerve.

These anomalies of innervation probably have some bearing on the unexpected localization of pain from these structures. We have, however, no certain knowledge of the anatomical basis of the reference of orbital and frontal pain from the basiocciput. Kellgren (1949) says: "It is probable that the false localization of deep pain results from a central misinterpretation of its source." He also warns us that "we should avoid constructing those fascinating diagrams of unorthodox pain pathways and pain mechanism whose intellectual neatness and completeness belie the facts and discourage further inquiry."

The question has been raised, "Is this migraine?" but it might be more helpful to inquire whether some examples of migraine originate in a deep lesion in the neck.

We are not yet prepared to say what is the nature of the lesion we have been studying, and have avoided debatable terms such as "fibrositis" and "rheumatism." We can describe it as a tender bony point (the first C.T.P. tip) often associated with tender areas in muscle, but not usually with any limitation of movement. X-ray pictures, so far as they have been done, show no abnormality. We feel that it is an important fact that the tenderness disappears with the relief of the headache.

With regard to treatment, it is difficult to say how much of the improvement was directly related to the exercises. In some cases suggestion may have played a part. In others the fact that someone had time to discuss the symptoms and examine the child thoroughly seemed to give both mother and child confidence and relief from anxiety regarding a serious underlying cause. Tension has been mentioned as a contributory factor in causation, and relief of this, either by removing anxiety or by doing the exercises, or both, has probably been helpful.

Conclusion

This work shows that headache and eye pain related to tenderness of the first C.T.P. tip are not uncommon in schoolchildren and may occur as early as 5 years of age. It is often thought by parents to be connected with the eyes and leads to the unnecessary wearing of spectacles in some children. It may persist for years, and gives rise to the excessive taking of aspirin.

In a few children it cleared up spontaneously, while in the majority it responded rapidly to simple explanation and relaxation exercises. It is notable that most cases had tender areas in the neck muscles which, together with the tenderness of the first C.T.P. tip, disappeared after this simple treatment.

The region of the basiocciput seems to have received little investigation. Palpation of it, and of the adjoining neck muscles and cervical spine, does not usually form part of a routine examination. We think the region merits systematic examination so that we may know more of its contribution to and connexion with the genesis of headache in childhood.

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THREE RECENT CASES OF ENCEPHALITIS LETHARGICA

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Encephalitis lethargica was first described by von Economo in 1917, although in retrospect it seems probable that similar cases had occurred before the outbreak in Vienna. During the next few years the disease was pandemic, and in 1929 von Economo wrote: "To-day there is hardly a medical man anywhere who has not seen a number of cases of this disease." However, it has now become much less frequent, and many modern authorities doubt whether the acute form still occurs. In view of this, three recent cases thought to be examples of the acute disease are reported here. The first is of particular interest because signs of post-encephalitic Parkinsonism, associated with characteristic behaviour disturbances, developed three years after apparently complete recovery from the acute encephalitis. The second and third cases occurred within a few days of each other in the same area of Northern Germany, and the acute illness in each case merged into a chronic post-encephalitic state with Parkinsonism.

Case 1

A police cadet aged 16 was of exemplary character. He had never been vaccinated. For several days before admission to hospital on April 22, 1951, he had a cold. On the day of admission he complained of frontal headache, and at 3 p.m. was found unconscious on his bed, with saliva pouring from his mouth. His tongue was not bitten and he had not been incontinent. By 4 p.m. he had regained consciousness, but was confused and talked nonsense. At 6 p.m. he lost consciousness again and was admitted to the Radcliffe Infirmary.

On examination he responded only to painful stimulation but did not speak. His temperature was 100° F. (37.8° C.), pulse 68, respirations 24, and blood pressure 110/70. There was a mucopurulent nasal discharge and slight conjunctival injection. Hiccups occurred intermittently and myoclonic twitching was observed around the mouth and in all limbs. Kernig's sign was positive, but there was no neck rigidity.