

# A History of Magnus in the Alexander Technique

The discovery by Rudolf Magnus of a ‘central control’ for some postural mechanisms has been used by Alexander and others as scientific support or proof of Alexander’s concept of the primary control.

The story of Magnus and his concept of a ‘central control’ in the Alexander Technique community is a story of misunderstandings, mistranslations, and the misapplication of science. Yet, whereas several other ideas, concepts and theories in Alexander’s writings are forgotten today, Magnus’ work is still discussed. Why? What is clear is that Magnus’ work was seized upon by Alexander and many of his supporters as scientific proof, or at least corroboration, from the mid-1920s until the South African Libel Case in the late 1940s. What is less clear is the continued referencing to Magnus in the Alexander Technique literature. This article covers some history of the Alexander Technique literature on Magnus through the decades.

## MAGNUS’ RESEARCH

Rudolf Magnus (1873–1927) was a German Professor of Pharmacology and researcher on the physiology of posture. In 1909 at the University of Utrecht, following his meeting with Sherrington, Magnus began to research the factors controlling changes of animal posture in relation to gravity and the muscular tone which maintains posture. Although concerned with the whole problem of posture, his experiments, carried out on the guinea-pig, rabbit, cat, dog and monkey, investigated in particular: 1) reflex standing; 2) normal distribution of tone; 3) attitude; and 4) righting function. To avoid the influence of volitional movement the experiments were done on decerebrate and other ‘spinal preparations’. A ‘spinal preparation’ (in cats and other animals) means that the spinal cord is cut at a level below the brain so that the higher (supraspinal) centres cannot influence lower ones.

Sherrington and his collaborators had already observed the effect of reflexes in three types of central nervous system transections: ‘spinal’ (where the spinal cord is separated from the brain), ‘decerebrate’ (where the transection is made in front of the medulla oblongata), ‘mesencephalic’ (where the transection is made in front of the entire midbrain), and ‘thalamic’ which preserves the thalamus. Each appeared responsible for its own set of reflex responses. Decerebrate animals were capable of ‘reflex standing’, a very rigid standing involving an abnormally high degree of tone on the extensor muscles, whereas ‘mesencephalic animals’ or a ‘thalamus animal’ maintained a normal posture without excessive muscle tone. Magnus, however, discovered that these reflexes were also dependent on the posture of the animal. For example, the effect of a knee jerk reflex was dependent on whether the leg on the opposite (contralateral) side was bent or stretched.

The maintenance of a body posture was thought to be dependent on a combination of the following four factors: reflex standing, normal distribution of tone, attitude, and righting function. The centres for these four functions were concluded to be located in close proximity to each other, subcortically in the brainstem.

His findings of a long and detailed series of experiments between 1909 and 1924 were summarised in his book, *Körperstellung* (1924).<sup>1</sup> (It was only published in English as *Body Posture* in 1987.)<sup>2</sup> Magnus gave two lectures in England which together provide a brief introduction to his work: 'Animal posture' (1925),<sup>3</sup> and 'On some results of studies in the physiology of posture' (1926).<sup>4</sup> Reports of his research were also published in the *British Medical Journal*, and Sherrington paid tribute to Magnus' work in his presidential address to the Royal Society, 1 December 1924.<sup>5</sup>

#### ORIGIN OF THE TERM 'CENTRAL CONTROL'

The term 'central control' was used in England to refer to Magnus' discovery of the location of various postural reflexes in the brainstem, between the upper cervical cord and the most anterior part of the mesencephalon (mid-brain). (Note that Magnus was not as such concerned with 'Zentralapparat' – the word hardly features in his *Körperstellung* – but with the system of reflexes governing vertebrate posture.) Magnus' term, 'zentraler Körperstellungsapparat' (literally: 'central body posture apparatus,') has also been translated as 'central nervous apparatus,' 'central mechanism,' 'body posture apparatus' and 'nerve centres in the brain stem'. Although the centre would exclude the macular otoliths, the semicircular canals and the proprioceptors, Magnus contended that it co-ordinated the sensory input from all these sources and that the centre itself was responsible for postural muscular tone – 'the normal distribution of tonus.' Witnesses in the South African Libel Case translated 'Zentralapparat' as 'nerve centres' – note the plural.

#### SOURCES OF CONFUSION

There are two immediate issues of confusion in the Alexander literature concerning Magnus' discovery: 1. translation of 'zentraler Körperstellungsapparat' into 'central control' (see above and Dr M. Douglas' 1950 letter below), and 2. to what extent the experiments with decerebrate animals are applicable to conscious human beings.

On the second point, Magnus himself, in lectures he gave in England, suggested several times the applicability of his findings to normal human adults, children and animals, and he has therefore contributed to the confusion. In his 'On some results of studies in the physiology of posture' he said:

Neck righting reflexes are very active in man. In children they have been studied by Landau, who showed that babies in the prone position usually bring the head by dorsiflexion into the normal position, and this is followed by strong lordosis of the vertebral column with extension of the limbs. Passive ventroflexion of the head causes disappearance of the lordosis so that the whole body becomes ventrally concave. Schaltenbrand published photographs of babies in which rotation of the head causes the body to roll from the supine into the lateral position, a reflex which, according to Zingerle, can be demonstrated in many patients. Text-book photographs of gymnasts give ample evidence of the presence of similar neck righting reflexes in normal adults.<sup>6</sup>

In the same lecture he also introduced the much used phrase in the Alexander Technique literature, 'the head leads and the body follows':

The mechanism as a whole acts in such a way that the head leads and the body follows. The attitudes impressed upon the body by a certain head position in

the decerebrate preparation closely resemble the natural attitudes shown by the intact animal during ordinary life.<sup>7</sup>

He also used the example of high-speed photographs of a golf swing which, he writes in 'Animal posture', shows 'sometimes postures in agreement with the laws of attitudinal activity of the brain-stem centres'.<sup>8</sup> And he stated that 'Many masterpieces of painting or sculpture representing human beings are consistent with the laws of attitudinal reflexes.'<sup>9</sup>

It is likely that these lectures, published in the *The Lancet* and *Proceedings of the Royal Society of London*, would have been the primary source of information for Alexander and his supporters rather than *Körperstellung*.

#### F. M. ALEXANDER'S SOURCE FOR MAGNUS

Alexander most likely first heard of Magnus from *The British Medical Journal (BMJ)* 24 November 1923. This was possibly by coincidence since the same issue contained a report from an annual meeting where Dr Peter Macdonald spoke briefly on the Alexander Technique ('The nervous child'). A few pages later appears an unsigned article, 'The significance of the brain stem in muscle tone and sense of position', which possibly is the first discussion in English of Dr Magnus' work. (On the front cover of this *BMJ* is scribed 'See page 963 ff. 971' – which refers to Dr Macdonald – and then, underneath, 'Magnus p. 1001'. This issue was in Ashley Place.<sup>10</sup>)

Inserted into this *BMJ* issue was a newspaper cutting (undated, but probably December 1923), where Sir Charles Sherrington is using his presidential address to the Royal Society to discuss Magnus's work. The report says: 'Any position other than the erect one excited in the reflex animal restoration of its erectness.' And: 'The well-known manoeuvre which enabled the cat, when inverted and falling from a short height, to right itself in the air during its fall, alighting squarely on its feet, was shown by Magnus and his colleagues to be executed perfectly by reflex action, after removal of the entire higher brain.' (The 'neck-righting' explanation for a cat turning in the air was superseded later.<sup>11</sup>) There is no reference to central control at his point, but the poignant phrase may be:

Magnus has shown that in decerebrate animals the attitude of the body as a whole – that is, the tonus as a whole – can be controlled by particular positions or attitudes of the head, a complementary movement of the body occurring on moving the head.<sup>12</sup>

It is obvious why Alexander and his supporters would have seized on this. The article discusses the various reflexes at work: labyrinthine reflex, neck reflexes, optic reflex, and others, and their interaction.

However, the article does specify that 'the exact localization of some of these centres has not yet been worked out in its entirety. . .' but Magnus 'has established that the centres for normal tonus and postural reflexes are to be found between a point at the most anterior part of the corpora quadrigemina and another immediately anterior the exit of the oculo-motor nerve from the mid-brain, and area of 1.5 mm in length. . .'

The term 'central control', translated from 'Zentralapparat', came later.

#### A HISTORY OF REFERENCES TO MAGNUS

The first reference to Magnus by Alexander appears in his 1925 lecture, 'An unrecognized principle'. Unlike later on, here he does not claim that Magnus' discoveries provide scientific proof.

Regarding the central control: in the technique I am using, it will interest you to know that during the last fifteen years, Magnus has worked to explain the scientific significance – as has been brought to our notice recently by Sir Charles Sherrington – in connection with that very control which I have been using for twenty-five years. The direction of the head and neck being of primary importance, he found, as I found, that if we get the right direction from this primary control, the control of the rest of the organism is a simple matter.<sup>13</sup>

Confusion starts when in *The Use of the Self* (*UoS*) Alexander equates primary control with Magnus' central control.

This primary control, called by the late Professor Magnus of Utrecht the 'central control' . . .<sup>14</sup>

John Dewey, in his introduction to *UoS*, makes the same mistake:

Magnus proved by means of what may be called *external* evidence the existence of a central control in the organism. But Mr. Alexander's technique gave a direct and intimate confirmation in personal experience of the fact of central control long before Magnus carried on his investigations.<sup>15</sup>

In a published letter in 1932 Alexander again equates the two:

. . . the primary control, the existence of which has since been conclusively proved by the experimentation of the late Rudolph Magnus of Utrecht.<sup>16</sup>

Alexander's description in the 1935 Bedford lecture does not equate the two, but does talk about the primary control being 'substantiated' by Magnus' research:

It was discovered at a much later period, some thirty years ago, and in recent years that discovery has been substantiated by the findings of no less a person than Professor Rudolph Magnus, of Utrecht, and generally recognized. Magnus found, by conducting experiments upon anaesthetized animals in the laboratory, that any interference with the controls concerned with the use of the head and neck in relation to the trunk modified and changed the use of the limbs.<sup>17</sup>

But then he adds later: 'That [pulling the head back] is a complete interference with the primary control that Magnus has worked out.'<sup>18</sup>

Again, in *The Universal Constant in Living*, the existence of a primary control appears to have been proven by Magnus.

. . . for the technique is based on the indivisibility of individual human potentialities in activity, of which the primary control is the governor. But the [Physical Education] committee makes no mention of such a control, despite the fact that the findings of the late Rudolph Magnus established its existence, . . .<sup>19</sup>

And again:

Some twenty-eight years after I had discovered this [primary] control and employed it in a technique the late Rudolph Magnus announced his discovery of it and its function, . . .<sup>20</sup>

Alexander was not alone. Many of his doctor pupils and supporters took the same view. Dr Macleod Yearlsey in a letter in *The Times Literary Supplement* in 1925:

This relation to environment demands a technique in which direction and guidance shall be built up consciously and constructively, employing the real central control in human activity. I would emphasize the fact that the central control thus employed is that advocated by Magnus and referred to by Sherrington in his recent address before the Royal Society. That this simple central control should have been discovered and used by Alexander thirty years ago is especially interesting, because it cleared the way for him to the recognition of the 'simple elements' and fostered the correct psychophysical attitude towards the 'familiar' and the 'unfamiliar.'<sup>21</sup>

Peter Macdonald, eye surgeon and the father to Patrick Macdonald, wrote in the *British Medical Journal*, in 1926:

Those of you who know the work of Professor Magnus of Utrecht, and who have read the most important lecture he delivered at Edinburgh on May 19th and 20th on the physiology of posture, in which, for instance, he points out that in his experiments on 'attitudinal reflexes' 'the whole mechanism of the body acts in such a way that the head leads and the body follows,' will see how the conclusion of Alexander as to the importance of the relation between head and neck, neck and trunk, is borne out by laboratory experiments. In fact, Alexander has in his work and in the technique he has devised for re-educating his pupils anticipated some of the results which Magnus and others have arrived at through these laboratory experiments.<sup>22</sup>

Dr A. Murdoch in a letter in the *British Medical Journal*, 1928:

I can fully endorse all that has been written about the importance of Mr F. Matthias Alexander's contribution to medical science and the need for an impartial examination of his work, especially now that it is supported by the results of the physiological experiments of the late Professor Magnus.<sup>23</sup>

Anthony Ludovici, a pupil of F. M. Alexander, though not a medical man, was fluent in German and read parts of *Körperstellung*. He too was convinced that Magnus' discoveries supported Alexander in his 1933 book on the Alexander Technique, *Health and Education Through Self-*

*Mastery*. He writes, without mentioning that the experiments were done on decerebrate animals:

Magnus arrived at this most momentous conclusion – *that the relative position of the head and the body*, and of different parts of the body to the head and neck, far from being a matter of indifference in regard to the postural reflexes, *exercises a profound and important influence both on bodily coordination and on the actual tone of the muscles concerned.*<sup>24</sup>

Patrick Macdonald, in a letter in *British Medical Journal* in 1939:

Alexander established that this control [the primary control] was connected with the relationship between the head and the neck and between the head and neck and the torso – a discovery which was independently rediscovered by Professor Magnus of Utrecht.<sup>25</sup>

The above statements by supporters do not claim scientific proof of the primary control from Magnus' central control, but rather sees support or confirmation for the existence of a primary control in Magnus' discovery of a central control. However, by 1932 other supporters of Alexander now take Magnus' discovery of a central control to be proof of a primary control and in some cases see them as identical. There was thus a gradual slide from 'corroborate' to 'confirm' or 'proof'. For example, Dr Mungo Douglas, an ardent supporter of Alexander, wrote in the *Medical World* in 1932:

This primary control is not a new invention, but is as old as man and animal life itself and is familiar to physiologists in Magnus's *Körperstellung*, and sometimes goes by the name of 'central control' among physiologists.<sup>26</sup>

Dr Mungo Douglas again, this time in *The British Journal of Physical Medicine*, 1935:

The great work of Rudolf Magnus set down in his *Körperstellung* has shown long ago that the primary control of the animal mechanism in use depends upon the relation of the neck and the head to the rest of the body mechanism in use, and that the tone of the muscles of the neck and head in use likewise conditions the tone of the whole body musculature.<sup>27</sup>

That doctors equated primary control with central control does not exonerate Alexander. It is unknown how much he consulted his medical pupils but he thanks Peter Macdonald in the preface to *The Use of the Self*, meaning at least he looked at the MS. From the above quotations it would appear that Alexander's medical pupils, Dr Mungo Douglas excepted, saw corroboration rather than proof in Magnus' research. For others, this may have appeared like pedantic scientific details, and they took Alexander's confidence at face value. The journalist Michael March (aka Arthur Busch) wrote in the New York newspaper, *The Brooklyn Citizen*, c. 1935:

He [Alexander] discovered that the primary control lay in a certain consciously directed use of the neck and head in relation to the spine and torso, and it was this control that was later to be confirmed by Magnus, through laboratory experiment

over a long period, who found that the relation of the head to the neck and to the torso effected a profound influence upon functional coordination.<sup>28</sup>

#### CRITICISMS

The first published criticism appeared in the editorial of the South African journal, *Manpower*, in 1944:

Since all this nonsense [that Magnus has considered the position of the head in relation to the cervical spine to be of unique significance for the conscious control of human posture] is liberally repeated by Alexander's followers, it is high time to state that Magnus has never described or claimed anything which bears even a faint similarity to what Alexander has alleged.<sup>29</sup>

The *Manpower* article led to the South African Libel Case,<sup>30</sup> and although Alexander won the case it was not an unqualified victory. For example, the judge, in summing up, said 'that many of the physiological reasons [for the technique] put forward [by Alexander] are wrong'. Whereas Alexander may have been triumphant as a result of winning the case, there is a sense of his supporters being chastened.

#### MISTRANSLATION?

Following the judgment Dr Mungo Douglas took responsibility for perhaps having misguided Alexander. Writing in 1950 Dr Douglas says:

I have had an intimate association with Mr Alexander for close on twenty-two years and have been with him when he was reading the account of Magnus's experiments, as described in *The Lancet* over twenty years ago, and when he was reading the account given in the Lane lectures. Further, I was at least one person who gave him 'a second-hand account, of them' inasmuch as I provided him with a translation from the original German in which Magnus wrote his book *Körperstellung*, and gave him what I considered to be the meaning of passages on p. 619. I understood these passages as the anatomical foundations a central integrating apparatus, its manner of operation, and its place of operation in the operation of the cerebro-spinal, sensory motor, and muscular mechanisms of the animal as a whole within the range of animals on which Magnus had experimented. I can claim no expert standing as a German scholar and may have been responsible for laying Mr Alexander open to a charge that he relied upon a person who was not competent to guide him. May I suggest that a reliable translation of these passages should now be made in order that their meaning in English may cease to be a matter of dispute?<sup>31</sup>

Dr Douglas' subsequent writings on the subject of the Technique show he was more careful when describing the similarities between Magnus' and Alexander's discoveries.

Alexander himself realised the potential confusion he had caused as people might think that the primary control is physically located in the brain or brain stem as is the 'central control'. In 1946 he wrote in a letter to Frank P. Jones: 'There really isn't a primary control as such. It becomes a something in the sphere of relationship.'<sup>32</sup>

Walter Carrington's article on Magnus and Alexander from 1950 strikes a delicate balance in his summing up:

Thus, Mr Alexander's term 'primary control' describes something far more extensive than Magnus' 'central apparatus', for it embraces all the postural activity of the organism, not only the 'brain-stem' mechanism but also the higher centres of the brain, and in particular, the cortical centres which Magnus did not investigate. In so far as Magnus demonstrated the function of the 'central control' as integrating the activity of the whole body musculature, this 'central control', must play an essential part in achieving that integration which Mr Alexander described as a result of the correct employment of the 'primary control'. Therefore, it may be said that 'central control' and 'primary control' are not identical, but the one forms an integral part of the other.<sup>33</sup>

#### LEGACY

Although no teacher of the Alexander Technique has referred to Magnus' central control as a proof of a primary control since the 1940s, several continue to argue for Magnus' work as being supportive evidence or in agreement with Alexander's concept of a primary control.<sup>34 35</sup>

While Dr Wilfred Barlow stayed clear of Magnus, Frank P. Jones endorses the view that 'the reflex response of the organism to gravity (the postural reflexes) is a fundamental feedback which integrates other reflex systems'.<sup>36</sup> He presents the hypothesis that the Alexander Technique restores a natural functioning of the postural reflexes.<sup>37</sup>

The issue is related to the question as to what extent the workings of the Technique depend on reflex activity (and on your definition of 'reflex'). If you take the view that the Technique works by the prevention of habitual activity which is interfering with a number of unspecified postural and other reflexes, and such reflexes, working unhindered, are 'righting' the organism as a whole, then naturally Magnus' findings are significant. However, no current science warrants such a view.<sup>38</sup>

#### STRETCH REFLEX

The role of the stretch reflex as an explanation for the workings of the Alexander Technique merits an article of its own. However, some historical parts bear relevance to Magnus. Sir Charles Sherrington, in his entry 'Brain' in the *Encyclopaedia Britannica*, 14th edition, 1929, vol. iv, wrote:

Another centre in this basal part of the brain is, in higher vertebrates, one which influences the general circulation of the blood by regulating the contraction of the muscles of the arterial tubes and to some extent of the heart itself. There lie also in this region reflex centres which maintain postural contraction of the extensor muscles of the limbs and trunk in response to passive stretch of these muscles. In the erect attitude of the animal these muscles are subjected by the weight of superincumbent parts to stretch and they are termed anti-gravity muscles; and this hind-brain region, therefore, executes a crude reflex of standing, traces of which can be executed even by the isolated spinal cord itself.<sup>39</sup>

This paragraph was quoted by Anthony Ludovici in his 1933 book on the Technique. Hence Alexander and no doubt several of his other pupils would have been familiar with the possible

contribution of the stretch reflex. This scenario – of the weight of the head causing the head to tilt forward from the atlanto-occipital joint, thus bringing about a stretch of the extensor muscles and so a toning up of the back musculature – has become one of the most reiterated explanations in Alexander Technique literature.<sup>40 41 42</sup>

Frank P. Jones,<sup>43</sup> and Walter Carrington<sup>44</sup> believed the stretch reflex to be a component of the workings of the Technique. Walter Carrington was influenced by the physiologist T. D. M. Roberts, who dedicated his career to the investigation of the physiology of postural mechanisms.<sup>45</sup> <sup>46</sup> Roberts refers to the stretch reflex as a component of the postural mechanisms.<sup>47</sup>

#### REFLEX-BASED EXPLANATIONS

The endurance of a reflex-based explanation is probably also connected with the fact that it fits people's subjective experience of the Technique, which typically involves feelings such as: 'it does itself', 'it happens by itself', it happens 'instinctively', 'naturally' and, indeed, 'reflexly'. (Confusion arises when the definition of 'reflex' is unclear. In daily usage it can mean 'automatically', 'by itself', 'spontaneously', 'without thinking', whereas in physiology the definition is much more exact.) If 'I' do not feel that I am 'doing it', then reflexes 'doing it' as an explanation is very appealing. However, feelings have more to do with perception and the psychology of perception than reflexes.

That aside, the role of the stretch reflex is of course not dependent on Magnus' postural reflexes (e.g. righting reflex, attitudinal reflex), but some may ask, if you can invoke one reflex in conscious voluntary behaviour why not the other? Well, there are different kinds of reflexes. For example there are early ('primitive') reflexes such as the tonic labyrinthine reflex, the moro reflex, etc., which exist in newborn humans but which are inhibited and integrated into more complex behaviours as the child develops. Certain motor reflexes may belong in a category where they are not called upon in a healthy adult. Roberts wrote in 1975 that: 'Motor control is pre-empted by voluntary processes and does not pass to the reflex mechanisms.'<sup>48</sup> And in 1982 that 'The role of the reflexes [in motor control] may be seen as that of prompts in the early learning of how best to deal with adverse changes in the environment. As the nervous system matures, the superior timing of the newly acquired "anticipatory pre-emptive actions" [i.e. learned reactions] has the consequence that the conditions for eliciting pure reflex responses are seldom allowed to arise.'<sup>49</sup>

Roberts also wrote in a review of F. P. Jones' collected papers that '[t]he relation between reflexes and voluntary behaviour is seriously misunderstood and the postural scheme put forward by Magnus and relied on here is now known to be invalid.'<sup>50</sup> However, Roberts's own text and illustrations of the neck and labyrinth reflexes which discuss changes in the angle between the head and the neck in his book *Understanding Balance* can mislead the reader into thinking these reflexes determine posture in intact adult animals, and humans.<sup>51</sup>

Whereas Roberts still saw a role for the stretch reflex in normal adults, the 1700 pages tome *Principles of Neural Science* (2013) concludes laconically on this subject in one paragraph that '... stretch reflexes are not the basis for postural control'.<sup>52</sup> Which of course is not the same thing as saying that stretch reflexes are not a component. However, this is for scientists to clarify; my purpose here is only to chronicle the enduring fascination and confusion (at least for the layman) with Magnus' work as (part) evidence for the workings of the Technique.

It is natural to seek a scientific explanation for the primary control given its importance, and Magnus' work suggested a simple and easy-to-understand account. In addition the experience of the conscious use of the primary control can feel so simple and uncomplicated, and perhaps we intuitively look for a scientific explanation which corresponds with our perception of simplicity. However, complex behaviour can both feel and appear simple (with sufficient training).

An additional reason that Magnus continues to command attention is because of Alexander's reference in *UoS*. No corrective note has been inserted in *UoS* regarding citing central control as proof of (or being identical to) the primary control, and none of the modern forewords to *UoS*<sup>53</sup> <sup>54</sup> corrects this obvious mistake, so the confusion may persevere and be replicated.

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