

**A probationary surgical essay, on dislocations of the thigh bone :
submitted,... to the examination of the Royal College of Surgeons of
Edinburgh,... / by John Gordon ... October, 1808.**

Contributors

Gordon, John, 1786-1818.

Publication/Creation

Edinburgh : Printed by J. Johnstone, [1808]

Persistent URL

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A
PROBATIONARY
SURGICAL ESSAY,
ON
DISLOCATIONS OF THE THIGH BONE;

SUBMITTED,
BY AUTHORITY OF THE PRESIDENT & HIS COUNCIL,
TO THE EXAMINATION OF THE

*ROYAL COLLEGE OF SURGEONS OF
EDINBURGH,*

WHEN CANDIDATE
FOR ADMISSION INTO THEIR CORPORATION,
IN CONFORMITY

TO THEIR REGULATIONS RESPECTING THE ADMISSION
OF

ORDINARY MEMBERS,

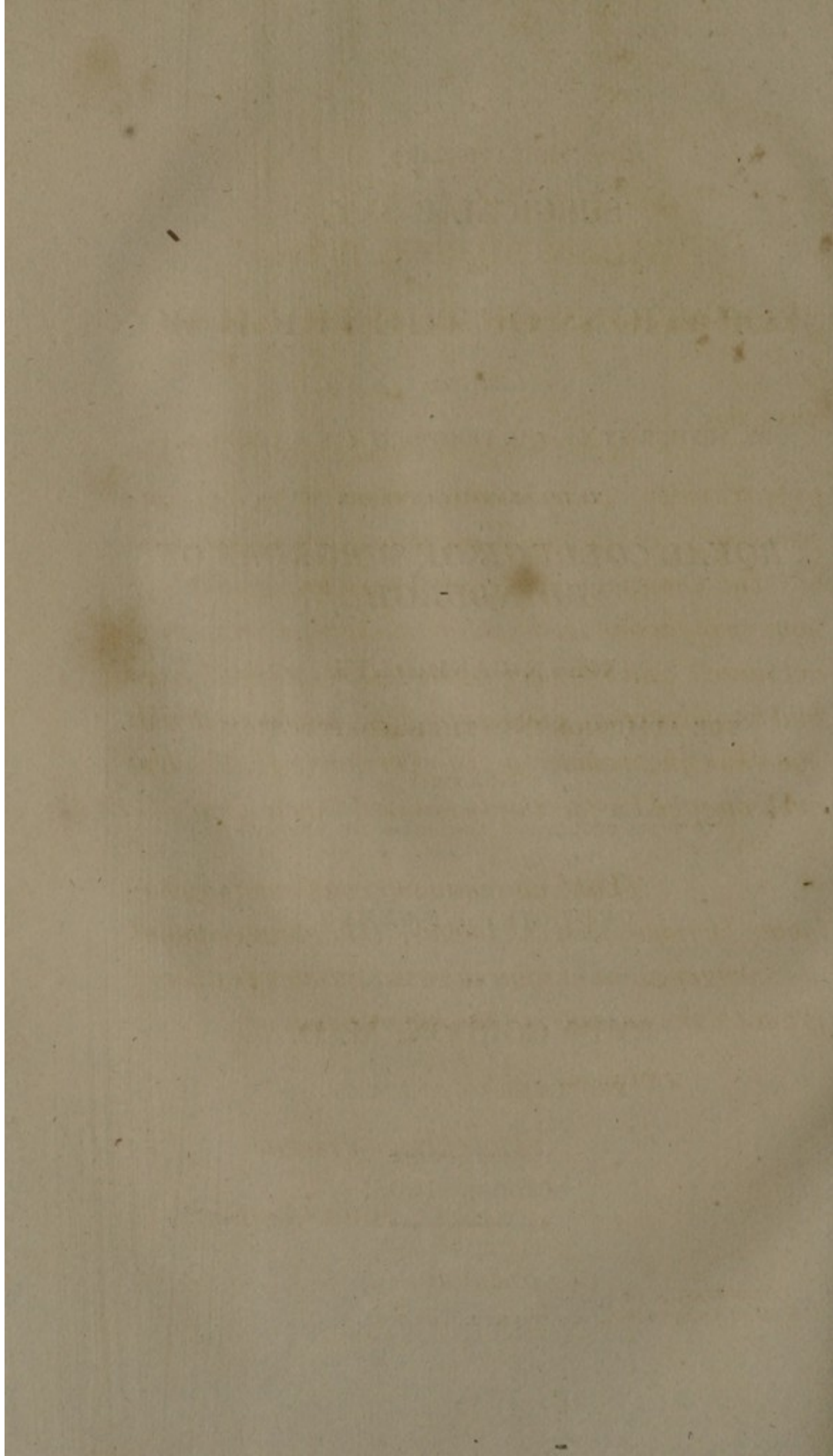
BY
JOHN GORDON, M. D.

LECTURER ON ANATOMY.

OCTOBER, 1808.

EDINBURGH:

PRINTED BY J. JOHNSTONE.



TO
ALLAN BURNS, ESQ.

LECTURER ON ANATOMY AND SURGERY, GLASGOW.

DEAR SIR,

I am happy to avail myself of the opportunity which is now afforded me, of expressing, in this public manner, my admiration of that laudable zeal for the improvement of your profession, with which you are continually actuated; and the very great satisfaction I have had in observing, the unfeigned pleasure which you take in promoting the exertions of all who are engaged in pursuits similar to your own.

That you may long continue to promote, by your useful labours, the advancement of Surgery, and enjoy the satisfaction resulting from their success, is the sincere wish of,

DEAR SIR,

Your obliged friend,

JOHN GORDON.

EDINBURGH,
October 18th, 1808. }

DISLOCATIONS OF THE THIGH BONE.

WHILE an intimate acquaintance with the Anatomy of the human body, is absolutely necessary to him who wishes to practise Surgery, with credit and success, it must be acknowledged, that those who are much occupied with dissection, are but too apt to overrate the practical importance of a minute knowledge of healthy structure. That surgeon would indeed justly hazard the imputation of rashness and presumption, who would imprudently venture to apply a ligature to the carotid or subclavian arteries, or attempt to remove the stricture in a strangulated crural hernia, without an accurate knowledge of the assemblage of important vessels which are included in the regions of the neck and groin: yet we do not allow ourselves to be much influenced by the opinions of the anatomist who affirms, that there are certain fixed and invariable rules, according to which, in every case, these operations are to be performed. We have learnt to infer, that the different regions of the body

include almost constantly similar organs in every individual; and we know, that these organs have usually a general relation to each other, in form, magnitude, and position. Yet very little further observation is sufficient to convince us, that these relations do not admit of being determined with mathematical precision. The form and position of parts, ascertained with the most scrupulous accuracy in one individual, are not to be adopted as the basis of a system of rules, by which the operative surgeon is invariably to be directed in the practice of his art. To inculcate on the minds of the inexperienced, that surgical operation consists merely in the study of the external form, and that it is solely regulated by the mathematical bearings of certain prominences and depressions on the surface of the body, is to encourage the rash and the ignorant to sport with the lives of their fellow-creatures, and entail disgrace and misery on themselves. Let the anatomical knowledge of the surgeon be minute as well as accurate; but let him at same time regard with attention, both the varieties in structure which are dependent on age and constitution, and the nature and extent of those changes which disease may have induced in the parts on which he operates. He will thus acquire such confidence in his own powers, and such prudent caution in exercising them, as will at once obtain reputation to himself, and ensure the comfort and the safety of his patient.

In reviewing the History of Dislocations, it will be found, that they are a class of accidents, the treatment of which has not unfrequently subjected the practitioner to the reproach of deficiency in anatomical skill. It is the object of the following pages to investigate to what extent this reproach has been merited in the treatment of one class of Luxations, those, namely, of the Femur, and to enquire how far *we* are capable of avoiding those errors which have been censured in our predecessors.

The earliest remarks on Dislocations of the Femur, to be found in the writings of the Ancients, are those which compose a part of the excellent book intituled ‘ Περὶ ἀρθρῶν ;’ a treatise, which has been attributed almost universally to Hippocrates. In more modern times, however, the authenticity of this work has been called in question. It has been argued, that it displays a general knowledge of anatomy and surgery, far more extensive than could have been possessed in the days of Hippocrates ; that it alludes to anatomical discoveries, which are allowed to have been made subsequent to his time ; and that it refers to him as the author of works, which are now ascertained to be spurious. Galen, however, regarding it as genuine, has made it the subject of a useful commentary ; and this circumstance alone, when we consider how fully competent the commentator was, from his intimate knowledge of the Greek tongue, and of the history of medicine,

to decide on the authenticity of his text, is sufficient to induce us to regard the great Hippocrates, and the son of Heraclides, as the author of this book, rather than Hippocrates, the father of Heraclides, to whom it has been by some ascribed. Be this as it may, the treatise is far from being unworthy of the Father of Medicine. That part of it in particular, which relates to luxations of the femur, is peculiarly valuable. The external characters, and frequent consequences of the four species of Dislocated Thigh Bone, are detailed with a minuteness and accuracy, which could only have been attained by actual and extensive observation. It is probably not without justice, that most succeeding writers have been accused of copying his precepts without adding to their number. Without entering into a tedious detail of the methods of reduction which Hippocrates has recommended, it will be sufficient to observe, that though the nature of his extending forces, and the means by which they were regulated, are not such as we would now be disposed to adopt, the period is but comparatively short since, after having undergone several inconsiderable variations, they ceased to be generally employed. We are convinced, too, that we do no more than justice to the merits of the 'Scamnum' when we affirm, that it seems calculated, from its construction, to accomplish the purpose of reduction with more facility, and probably with less hazard, than any of those machines which the misplaced ingenuity of succeeding writers

have proposed to substitute in its stead. Hippocrates, we are well assured, was but imperfectly, if at all acquainted with the number, attachments, and uses of the muscles which surround the hip joint; and hence it is probable, that his methods of curing the Luxations of the Femur, would be chiefly suggested, by the imperfect ideas which he could acquire from the study of the skeleton simply, of the position which the head of the displaced bone had assumed. To the same cause, there is every reason to believe, may be traced those misconceptions which prevail on this subject, even at the present day, notwithstanding the superior opportunities which we possess of acquiring more accurate information.

The occasional success of a few skilful manipulations in accomplishing a Reduction, after the failure of the most powerful machinery, clearly demonstrates, that as much, in the cure of dislocations, may depend on the address of the surgeon, as on the strength of the mechanical force which he employs. But this address, in order to be generally effective, must be the result of the justest ideas of those changes, which the luxation has induced in the arrangement of the parts surrounding the articulation. It will readily however be acknowledged, by those who peruse with attention the works of practical authors, that though the muscles attached to the dislocated limb, present the most effectual, if not the only resistance to reduction in recent luxations, the derangement which these may have undergone, has been too generally disre-

garded in the method of cure. The practitioner, misled, as it would seem, by artificial imitations of luxation on the dried bones of the pelvis and femur, appears, in the extensions, counter-extensions, and rotations which he employed, to have had in view only, the resistance opposed by certain depressions and prominences in the ossa innominata to the passage of the head of the femur back into the acetabulum. We are strongly inclined to believe, that the reproach to which this department of surgery has been exposed, has arisen solely from this imperfect manner of studying the anatomy of dislocations. But although we are willing to allow the justness of the censure on this account, we cannot so readily admit the accuracy of those principles, which they have advanced, by whom the censure has been made. It is not unusual to hear it remarked, that the principal obstacles which present themselves to the reduction of a Luxated femur, are such as the muscles of the thigh, stimulated to violent contraction by an injudicious application of the extending powers, are calculated to exert; that by an accurate knowledge of the attachments and actions of these muscles, they may be made to assist, instead of opposing the reduction; and thus, by a happy application of anatomical skill, a dexterous adroitness may be made to supplant altogether a painful and violent extention. If, however, the study of the prominences and depressions on the ossa innominata, are wholly insufficient to enable the surgeon to devise the easiest means of

reducing a luxated thigh bone; the most intimate acquaintance with the attachments of the muscles of the thigh, and the most extensive knowledge of their simpler and more compound motions, will not of themselves, we are persuaded, accomplish this object. It is the very nature of the injury, to induce such a total alteration in the position and powers of the muscles surrounding the joint, that the result of our observations on their healthy action, admits only of limited practical application; and we have to learn, therefore, the new and unnatural arrangement of parts which has taken place.

From the position which the head of the bone assumes, in all the species of Luxated Femur, it will appear, that extention of the limb, varying in degree according to the nature of the accident, will almost in every instance be necessary in effecting a reduction; and experience has fully shewn, how much the degree of extension requisite may vary, according to the age and constitution of individuals. But by far the most difficult, as well as the most important part of the treatment, is to determine, in what direction the extending force ought to be applied, how it ought to be modified, and with what other motions it ought to be accompanied. These are points which, it is obvious, can only be ascertained, by determining, amidst the violent derangement which has been induced, what muscles contribute to retain the head of the bone in its displaced situation, what are most calculated to oppose, and what to

favour its return to the acetabulum, during the operation of the extending force.

And how, it may now be asked, are these objects to be attained? Luxation of the thigh bone, unless complicated with some more serious injury, is not a fatal accident; and hence opportunities of ascertaining by dissection the state of parts, in actual and recent dislocations, are but of rare occurrence. If we assume it as a fact, that the head of the femur, in the different kinds of luxation, occupies invariably a certain position, we may, from a knowledge of the relative position of the surrounding parts in a healthy state, form a conception of the changes, which the derangement will produce, in the situation of the muscles. But this will only afford us an approximation to the truth. The descriptions of the celebrated Petit, and in particular those of M. Boyer, appear to have been furnished in this manner; and although far more minute than any which we yet possess, they are inaccurate as well as deficient in many respects.

We have endeavoured to obtain more perfect information on this subject, by producing artificially, on the dead body, the different species of luxated femur which occur in practice. The soft parts surrounding the articulation being previously dissected, we are thus enabled to mark at once, the efficiency of certain parts in resisting luxation, the position which the head of the bone occupies when the luxation has taken place, and the derangement induced

among the muscles. To such as may be disposed to doubt the exact similarity of circumstances existing between a dislocated femur in the living, and an artificial imitation of this accident in the dead body, we may venture to observe, that if the knowledge which we acquire by this means of the anatomy of dislocation, does not possess perfect accuracy, it at least approaches nearer to the truth than what is derived from any other source. We are induced to rely with greater confidence on the information obtained by this method, that we have found it exceedingly difficult, if not altogether impossible, to produce, artificially, any other species of luxation of the femur than those which actually present themselves in practice; and that the external characters of the real accident in the living, and of its imitation on the dead body, have always corresponded closely with each other.

In stating the result of our observations, conducted in this manner, we do so, chiefly from the hope that the enquiry may ultimately be productive of advantages to this department of surgery; and we are anxious that our remarks should be regarded, less as deserving attention in themselves, than as hints for the further prosecution of this subject by others.

In considering more at length the different species of Dislocations of the Femur, it will be proper to have in view the following objects:—

1. To determine the circumstances which are necessary to the production of each species of Dislocation;
2. The state of parts after the Luxation has taken place ;
3. The external characters of the Dislocation, or the general appearances of the limb indicating the existence and the nature of the injury ; and,
4. The mode in which the Reduction may be most easily accomplished.

It is almost a matter of indifference which species of injury we first take into consideration. Some advantages however may result from treating in succession of the Luxations which occur backwards, and afterwards in the same manner of the two which take place forwards. According to this order, the reflections suggested by the anatomy of one Dislocation, will more readily admit of application to that of another.

LUXATION UPWARDS AND BACKWARDS.

The first step, in the production of this, as well as of the other Dislocations of the femur, is the laceration of the Capsular ligament. If while the limb is rotated inwards, inclined forwards, and at same time in a state of adduction, pressure be exerted in the direction of the os femoris, the superior and posterior part of the capsular ligament will suffer distension from the head of the bone. If the pressure is inconsiderable, the ligament will receive support, and displacement be prevented, by the Piriformis and lesser Glutæi muscles, which, in this position of the limb, are violently stretched across the head of the bone. But the application of a sudden and violent force, such as that produced by falling forwards on the knee, or from a considerable height on the soles of the feet, or by a great weight pressing unexpectedly on the trunk of the body, will rupture the capsular ligament under the tendons of the Piriformis and Obturatores muscles. The head of the femur is then elevated from its socket, the Interarticular ligament gives way, and the Glutæus minimus, Piriformis, and Obturator internus muscles, although stretched to a degree little short of laceration, are unable to oppose any effectual resistance to the displacement.

The head of the bone, passing quickly over the brim of the acetabulum, slips upwards and backwards to the superior and anterior margin of the sciatic notch, where it remains. In this position, it is covered superficially only by the *Glutæus maximus*, lying between the inferior margins of the lesser *Glutæi* and *Pyriformis* muscles above, and the *Obturatores Gemelli* and *Quadratus* below. All these muscles are in a state of relaxation, except the *Obturator externus*, which is very violently extended. The superior portion of the *Adductor magnus* is considerably elongated, and the common tendon of the *Psoas magnus* and *Iliacus internus*, very little stretched, passes across the acetabulum.

The position which we have described the head of the femur as occupying, does not accord with the ideas which practical authors in general have entertained of its situation in this species of Luxation*. It is usually described as lodged in the dorsum of the ilium, in contact with the hollow surface of the bone on the one side, and covered by the belly of the *Glutæus minimus* muscle on the

* Mr. Hey alone, of all the practical authors whose writings we have had occasion to consult, seems to have formed a correct conception of the part on which the head of the femur rests. In the case so accurately detailed in his "Practical Observations" p. 312, he observes, "According to the best judgment which I can frame, from the anatomy of the parts, I should conceive, that the head of the bone lay at the edge of the sacro-sciatic notch, near the inferior and posterior edge of the *Glutæus medius*."

other. "The head of the femur," says Boyer,
 "forced towards the superior and external part of
 "the acetabulum, breaks the internal and orticular
 "ligaments, escapes through the laceration in the
 "latter, and ascends on the external face of the os
 "ilium; but as the part of the os ilium, imme-
 "diately above, and at the external side of the
 "cavity, is very convex, the head of the femur
 "soon abandons its first position, and slides back-
 "wards and upwards into the external fossa of the
 "os ilium, following the inclination of the plane
 "towards this fossa, and obeying the action of the
 "Glutæi muscles, which draw it in this direction."
 "The head of the femur," he continues, "in ascend-
 "ing thus on the external face of the os ilium,
 "pushes upwards the Glutæus minimus, which
 "forms a sort of cap for it; and the Glutæus maxi-
 "mus and medius are relaxed, by the approxima-
 "tion of the points into which they are inserted *."
 This imaginary description, originally suggested,
 in all probability, by the study of the skeleton, we
 cannot help regarding as far distant from the truth;
 not merely because it is at variance with the result
 of our experimental observations, but because it

* See Lectures of Boyer on the Diseases of the Bones, translated by Farrell, vol. ii. p. 156.

Richerand, by whom the Lectures of Boyer were arranged into a systematic treatise, has, in a late work, intituled "Nosographie Chirurgicale," tom. ii. p. 274. adopted, as might have been expected, the opinions of Boyer, in the passage quoted, without any modification.

does not correspond with the appearances which have been remarked by Mr. Trye, in the only case, as we believe, of dissection after this species of Luxation, which has yet been put on record *.

Mr. Trye's patient died on the twenty-second day after the accident which dislocated his thigh bone, in consequence of severe injuries which he had received in other parts of his body at the same time. Nothing can agree more exactly, with the acknowledged characters of luxation of the femur upwards and backwards, than the delineations which Mr. Trye has given of the external appearance of the limb †; and it is a circumstance calculated to beget considerable confidence in the accuracy of the method of studying the anatomy of luxation, in general, which we have ventured to suggest, that the situation of the head of the femur in this species of luxation, as described from an artificial imitation of the accident, agrees exactly with what Mr. Trye found it to have occupied on dissection. In Plate III. of his "Illustrations," Mr. Trye has delineated the appearance of the head of the bone, as it was brought into view on raising the Glutæus maximus muscle; not placed on the dorsum of the ilium, but inferior to the margins of the lesser Glutæi. It may

* See "Illustrations of some of the Injuries to which the Lower Limbs are exposed," by Charles Brandon Trye.

† See "Illustrations," &c. plate i. and ii.

be remarked further, that the situation of the parts surrounding the joint, as described by Boyer, does not accord with the usual symptoms of this species of Luxation. It is rarely, we believe, that the shortening which takes place in the luxated limb, is observed, in recent cases, to exceed two inches; whereas, did the head of the femur occupy the external fossa of the ilium, the shortening, in a full grown person, could not be less than three or four. In fact, it would seem, that after the head of the bone has escaped over the brim of the acetabulum, its progress upwards, in the direction of the crista ilii, is effectually limited by the Obturator externus muscle; and probably also by that portion of the capsular ligament which yet remains attached to the socket. If, in short, the head of the femur is ever found lodged high up on the dorsum of the ilium, if an artificial joint is occasionally formed in this situation, we should be disposed to regard it as a secondary affection to luxation upwards and backwards, and one which in any case cannot occur, without complete rupture of the Obturator externus and Quadratus, and partial laceration of the Adductor magnus muscle; as well probably as of those which are inserted into the lesser Trochanter.

AS EXTERNAL CHARACTERS of this dislocation, we remark in particular, that the luxated limb is considerably shorter than the sound one. In experiment on the full grown subject, it was found, that

when the head of the bone rested on the superior and anterior margin of the sciatic notch, the limb was shortened about two inches. As far as we have learnt, the shortening is seldom observed to exceed this when the accident occurs in the living body *.

The toes are turned inwards, the knee is inclined considerably forwards, and the whole limb is in a state of adduction. Petit † and Duverney ‡ ascribe these inclinations of the limb to the violent extention of the Triceps adductor muscle. We have seen, however, that, in this Luxation, only a small portion of the Adductor magnus is stretched; and indeed were the whole of the Triceps in a state of great elongation, the effect, we presume, would rather be to turn the toes outwards. Mr. Trye, in accounting for the rotation inwards of the thigh, seems to attribute to the Psoas and Iliacus internus muscles, an action which they cannot exert, either in the natural or the luxated state of the limb. We shall give his opinions, however, in his own words, as we are obliged to acknowledge that we do not fully understand them. “When the head of the bone,” observes Mr. Trye, “falls out of its socket, all the muscles inserted in or about the great trochanter, are in the condition of a pulley rope

* To those who may deem this shortening inconsistent with the change of position which the head of the femur is described to have undergone, we recommend the study of Albinus' Second and Third Tables of the Skeleton.

† Diseases of the Bones, p. 149.

‡ Diseases of the Bones, p. 267.

“ which has slipped out of its groove, and there-
 “ fore they lose their power as rotators. If, in the
 “ Luxation, the force be so applied as to drive the
 “ bone upwards, the tendon of the Psoas and Iliac-
 “ us internus being still in its groove beneath the
 “ anterior superior spine of the ilium, those muscles,
 “ having now no antagonist to oppose, will draw the
 “ lesser trochanter nearer to the pubis, and of course
 “ turn the knee inwards.”* Boyer, who regards
 the general rule as established, that luxated mem-
 bers always take a direction, determined by the
 elongation of the muscles of the side opposite that
 to which the luxated bone is carried, finds himself
 at a loss to explain the inclination of the thigh in
 this case; “ for,” says he, “ the Obturators Gemini
 “ and Quadratus femoris, being elongated, the point
 “ of the foot ought to be turned outwards.” “ This
 “ phenomenon,” he adds, “ depends perhaps on the
 “ external portion of the orbicular ligament which
 “ comes from the anterior and inferior spine of the
 “ os ilium; this portion, which is very thick, being
 “ elongated in the luxation outwards, draws the
 “ great trochanter forwards, and consequently turns
 “ inward the entire limb.”† But it appears to
 us unaccountable, that any more sufficient reason
 should be sought for to explain the position of
 the limb, than that which the position of the head

* “ Illustrations,” &c. p. 23.

† “ Lectures,” vol. ii. p. 158.

of the bone affords. If the head of the femur is turned towards the sciatic notch, and the trochanter major towards the anterior spine of the ilium, it is obvious that the toes will point inwards; while the relative position of the acetabulum, and the part on which the head of the bone now rests, readily explains the inclination of the limb forwards, and its state of adduction.

In the natural state, and in the erect posture, the top of the trochanter major may be felt on the same plane with the tuberosity of the pubis, and considerably to the outside of a line drawn perpendicularly from the anterior and superior spinous process of the ilium. By these marks, and by a comparison with the sound limb, it will be perceived, that in the luxation upwards and backwards, the trochanter is situated higher up and more internally than is natural. It elevates the belly of the *Tensor vaginæ femoris*, and the anterior margin of the *Glutæus medius*, and occasions a roundness and convexity nearly under the superior spine of the ilium, which will be very evident when contrasted with the natural swell towards the superior and outer part of the opposite thigh.* The head of the femur may be felt by the fingers, particularly in thin persons, underneath the middle of the *Glutæus maximus* muscle,† occasioning a fullness

* See Trye's "Illustrations," plate i.

† Hey's "Practical Observation," p. 313.

of the buttock, instead of the slight depression which naturally exists at this point in the erect posture. The flexure of the hip, or that depression in the integuments which follows the course of the inferior margin of the *Glutæus maximus*, will, by the shortening of the limb, have a less oblique direction than that of the opposite side.* Petit has affirmed, that the extension of the *Triceps adductor* is so violent in this luxation, as to occasion the feeling of a cord, stretching from the pubis to the middle part of the thigh.† We doubt extremely whether this symptom has been described from nature; at all events, it must be quite apparent, even from the general inclination of the limb, that it cannot depend on the elongation of any of the adductors. The flexion of the thigh, in the luxated state, seems to admit of being considerably increased; but all attempts at extension or abduction, are powerfully resisted by the *Obturator externus*, and, from the violently elongated state of this muscle, are necessarily accompanied with great pain. From the situation of the head of the femur, rotation outwards or inwards do not appear practicable to any extent ‡.

* Trye, plate ii.

† “Diseases of the Bones,” p. 149. The elongated state of the *Triceps* is also asserted by Pouteau, “*Oeuvres Posthumes*, tom. ii. p. 220; and more lately by Mr. S. Cooper, “*First Lines*,” &c. p. 551.

‡ The most striking characters of this luxation are thus shortly stated by Hippocrates:—“*Quibus in exteriorem partem femoris caput elabitur*,

These external characters taken together, will in general enable us to distinguish easily the luxation of the femur upwards and backwards from fracture of the neck of this bone. It is necessary to remark, however, that the inclination inwards of toes, is not the diagnostic symptom of most importance, or one which is singly to be relied on; since it appears that the rotation outwards of the limb, is by no means a constant effect of fracture of the neck of the femur. For a summary detail of all the facts connected with the diagnosis of these two accidents, we refer with confidence to the "Lectures of Boyer." *

The shortening of the limb, and its general inclination, in this species of luxation, may be very closely imitated by those even who have suffered no accident; and patients occasionally present themselves in hospitals, who are bold as well as artful enough, to practice this deception for particular purposes. The surgeon, on repeating this imitation

"crus, si cum altero extendatur, brevius est. Interior autem regio quâ crura diducuntur, cava magis conspicitur, et gracilior fit: Exterior verò gibba ut in quam venerit femoris caput; sed et clunis apparet superior, quùm, quâ ibi caro est cedat capiti femoris. Femoris item extremitas, quæ ad genu est, intrò spectat, non secus etiam crus et pes." Galeni in Hippocratem De Articulis Comment. Tert.—Vido Vidio. Interprete, p. 272.

* Vol i. p. 194.

Such as are desirous of more particular information on this subject, may consult, Paree's Works, p. 343;—Petit, Diseases of the Bones, p. 303; Duverney, Dis. of the Bones, p. 139;—Sabatier, Mem. de l'Acad. Roy. de Chir. t. x;—Louis, ib;—Desault, Oeuvres Chir. t. i. p. 221.

in his own person, will soon be convinced, that the shortening of the limb does not depend on any displacement of the thigh bone, but is accomplished by means of a motion 'en bascule' of the pelvis on the opposite femur, by which it is elevated, and thus the apparently diseased limb is rendered shorter. It is from this cause also that the imitation is always most successfully practised in the erect posture, when station on the opposite limb affords a steady centre of support to the motions of the pelvis. In this posture, too, the *Glutæus medius* and *Tensor vaginæ femoris*, of the opposite side, may be felt, if not seen, in a state of powerful contraction, pulling down the pelvis on that side, and thus raising it on the other. The surgeon, who is aware that such deception is sometimes attempted, will find it easy to detect it, by the want of that fulness in the hip which is the consequence of luxation; by the ease with which the limb may be extended; by the extent of the rotation outwards and inwards, which is practicable, when the patient is placed in the horizontal posture; and by an obvious inclination of the body to the side on which he stands, when he is erect.

To consider minutely the various mechanical means, which, since the time of Hippocrates, have been recommended, for effecting extension and counter-extension in luxations of the Thigh bone, would lead to a very tedious and unprofitable detail. Experience has shewn, that the force which is afforded by the hands of intelligent assistants is the safest, and the

most effective, because the most easily regulated. We shall therefore confine ourselves, merely, to a few observations on the manner in which this force ought to be applied.

The patient being laid on his side on a table, with the affected limb upmost, the middle of a broad girth is to be placed between the inside of the sound thigh and the scrotum, and its extremities carried obliquely across the back and belly to the opposite shoulder, where they are to be firmly secured to a fixed point. This girth, together with another, the middle of which is laid obliquely along the fore part of the crista ilii, and its extremities held down by assistants, will be sufficient to fix the pelvis *. In recommending the application of the extending force, not to the luxated bone, but to that which is articulated with it, M. Dupoui † and M. Fabre ‡ had chiefly in view, to avoid those spasmodic contractions of the muscles, which the compression of the 'Lacs' have a tendency to excite. If, from the nature of the dislocation, the muscles are already extended, they will much more readily pass into this state of spasm. But in luxa-

* For this simple mode of making the counter-extension, we seem to be originally indebted to Fabre, see his "Essais de Physiologie," p. 241.

† Journal de Medecine, tom. xxvi.

‡ Essais de Physiologie.

tion of the femur upwards and backwards, it is obvious that the shortening of the limb, will occasion a relaxation of all the flexors of the leg, and such of the extensors as take their origin from the os innominatum. On this account, therefore, the 'lac,' by which the extension is to be made, may be applied immediately above the knee, with less fear of stimulating the muscles to spasmodic action. We do not wish this, however, to be adopted as a general rule, because in some individuals, and in particular states of the system, it may be found much more advantageous to make the extension from the lower part of the leg.

Petit had directed, that the thigh should be inclined forwards at the commencement of the extension, and moved backwards when the extension was thought sufficient. Pouteau, conceiving that the violently elongated state of the Glutæi and Triceps adductor, opposed the principal obstacle to the reduction, recommended that the thigh should be bent to a right angle with the body, as the only means of relaxing completely these muscles *. We know, however, that in this luxation, neither the Triceps nor Glutæi are stretched; and were it otherwise, we presume, that though the former might be relaxed by the flexion of the thigh, the tension of the latter would rather be increased. It is a sufficient objection to this position of the

* Oeuvres Posthumes, t. ii. p. 225.

limb, that it is calculated to create obstacles to the reduction, by stretching, and thus stimulating to contraction, the *Glutæi* muscles, and even the flexors of the leg. We may add, too, that from the inclination which is thus given to the head of the bone, we deprive ourselves altogether of the assistance which we might otherwise derive from the rotation outwards of the thigh. The object of the extension is, to bring down the head of the femur to a level with the acetabulum. This will be most easily and most safely effected, by extending the thigh exactly in the direction which the Luxation has given to it. Extention alone, however, would only have the effect of bringing the head of the bone immediately behind its socket; it is therefore necessary to combine with it, rotation outwards of the toes, which will elevate the trochanter major, and turn the head of the femur towards the acetabulum. The height of the brim of the socket has a tendency to oppose this motion of rotation; and in order to counteract this effect, a towel ought previously to be passed under the upper part of the thigh, by which the surgeon, while the head of the femur is pulled downwards, and turned from the sciatic notch towards the acetabulum, may elevate it to a level with the edge of this cavity.

Almost all authors since the time of Hippocrates, agree in regarding the luxation upwards and backwards of the thigh bone, as next, in point of fre-

quency, to that downwards and forwards.* We believe it might be asserted, with more accuracy, to be fully as common in its occurrence as this last species. The anatomy of the joint does not afford any satisfactory reason for this frequency. The brim of the acetabulum is higher towards the superior and external part than at any other; and although the capsular ligament is rather thin, its rupture in this direction is strongly opposed, by those muscles which are inserted into the femur, at the root of the tro-

* “Quodd si femoris articulus è coxâ prorumpat, prorumpit autem in quatuor partes, sæpissimè in interiorem, deinde in exteriorem, in priorem et posteriorem excidit quidem, sed rarè.”

GALENI IN HIPPOCRATEM, Comment. loc. cit. p. 295.

See also Petit, “Diseases of the Bones,” p. 247; and Boyer, “Lectures,” vol. ii. p. 155.

We are altogether at a loss to account for the very decided manner in which an opposite opinion is stated by two most respectable modern authors.

“It is said by authors, that the head of the femur may be luxated in various directions; namely, upward and backward, upward and forward, downward and backward, downward and forward; and, I may add, directly downward. That all of these may happen, I cannot take upon me to deny; but I believe few practitioners have met with an instance of the first and third. I have never seen any variety of this luxation, if it be not that in which the head of the femur is pushed downward and forward and lodged in the foramen ovale.” Mr. BENJAMIN BELL, Syst. of Surg. vii. 166.

“Versus posteriorem et superiorem, vel anteriorem et superiorem partem vix unquam occurrit luxatio femoris primitiva, ab injuria externa exortu; si vero sparsim observata fuit hæc luxatio, potius existimandum est post luxationem factam ab attractione musculorum, vel dum æger luxatione facta pedibus insistere conatur, hunc locum occupasse. Luxationem vero femoris consequetivam et lentam versus posteriora et superiora pluries ipsi observavimus.” CALLISEN, System. Chirur. Hodiern. vol. ii. p. 586.

chanter major. The cause, we believe, is rather to be found, in the greater frequency of violent forces, applied to the femur while it is in that position, which we have already described as most favourable to the production of this species of luxation*.

* We hardly conceive it possible that a luxation of the femur upwards and backwards can occur, where the trochanter major is turned backwards, the head of the bone forwards, and consequently the toes very far outwards, without a fracture of the brim of the acetabulum. The case related by Mr. S. Cooper, in his "First Lines," &c. p. 156, more resembles an accident of this kind than any other that we have met with. There are however some inconsistencies in the detail of the case, which render it impossible to pronounce decidedly on its nature.

Schumacher also mentions a case of luxation upwards and outwards, in which the toes are described as being turned to the back and the heel forwards: "Die zehen stunden nach dem Rücken und die ferse vorwärts, und der Kopf liess sich deutlich fühlen." Schmucker, Vermischte Chirurgische Schriften, Erst. Band. 237. But it is impossible to learn from this description, or from the other particulars of the case, what position the head of the bone had assumed.

LUXATION DOWNWARDS AND BACKWARDS.

In the production of the luxation of the femur downwards and backwards, it is necessary that the displacing force should be applied to the knee, sole of the foot, or trunk of the body, at a time when the thigh is inclined nearly as much as is practicable to the opposite side, rotated to the utmost extent inwards, and bent to a right angle with the pelvis, or even more. The capsular ligament, tho' supported by the Pyriformis, Obturator Internus, and Gemelli muscles, is ruptured towards the inferior and posterior part. The round or interarticular ligament is torn across*, and the head of the bone immediately escapes out of its socket. After being pushed over the brim of the acetabulum, the head of the femur might pass downwards, into a narrow groove which exists between the inferior part or corner of the brim, and that rough surface on the upper part of the *Tuber ischii*, which serves for the attachment of the *Semimembranosus*, the long head of the *Biceps flexor*, and the *Semitendinosus* muscles. But this

* We were not a little surprised to find it affirmed by Bichat, an author in general so accurate, that any partial laceration of this ligament will permit the head of the femur to escape from the acetabulum: "*Je remarque*" says he, "*que dans la luxation en bas et en dehors, le faisceau attaché à l'extrémité supérieure de l'échancre peut être rompu seul.*"

space is too small and too much on a level with the edge of the socket to afford a permanent resting place for the head of the femur. We have found in our experiments, that it slipped into a triangular and slightly hollow space, which is bounded by the inferior part of the dorsum of the acetabulum above, by the spinous process of the ischium behind, and by that smooth surface above the tuber ischii, over which the Obturator internus muscle plays, below. It appeared to us, however, that its permanence in this position could only be secured by a single circumstance: For if, in escaping over the brim of the acetabulum, it threw the Obturator internus on its inferior part, the weight of the body would immediately force it into the precise situation which we have described it as occupying in the first species of luxation. If, on the other hand, it forced its way between the Obturatores muscles, so as to have the Obturator internus and Gemelli embracing it above, and the Obturator externus and Quadratus below, then the two former would effectually prevent its being pushed upwards, by any force acting from below, or by the weight of the body acting from above. Experience alone can determine, how far this is the state of parts when the luxation has taken place in the living body. In the mean time, one would be disposed to infer, from the infrequency of the accident, that its occurrence depended on some such fortuitous event as that which we have mentioned. Besides the muscles which we have enumerated, the anterior

and middle portions of the lesser Glutæi and the Pyriformis are in this case greatly extended, and the common tendon of the Psoas magnus and Iliacus internus is firmly stretched across the acetabulum.

The limb is slightly, if at all, elongated in luxation downwards and backwards. The thigh, however, is in a state of adduction, and the knee inclined considerably forwards. The great trochanter, sinking backwards and a little downwards, will occasion a flatness towards the upper and outer part of the thigh, instead of the natural roundness which may be perceived on the opposite side. An unusual fulness will be remarked about the lower part of the buttock, and it is possible that the head of the bone may be felt through the Glutæus maximus, above the tuberosity of the Ischium. Extension, abduction, and rotation of the limb will be equally impracticable as in the former species of dislocation, and for the same reasons.

In the reduction of this luxation, we cannot perceive that any advantages are likely to be obtained, by making extension, with the limb bent to a right angle with the body. On the contrary, this mode of practice, is obviously calculated to produce very inconvenient effects. We doubt even how far it is practicable, to the extent to which it has been recommended by some, without danger of rupturing the Obturator externus and Quadratus muscles. Much extension, in any direction, seems altogether unnecessary. While an assistant, laying hold of the heel

and fore part of the foot, extends the leg on the thigh, and pulls the limb steadily towards him in the direction which the luxation has given it, let the surgeon pass a towel under the upper part of the thigh, and raise the head of the femur to a level with the brim of the acetabulum. A slight rotation of the toes outwards by the assistant, will then be sufficient to turn the head of the bone into its socket.

Luxation downwards and backwards may be regarded as the least frequent in its occurrence of any to which the femur is liable*. For this we can only assign as reasons; that, from the direction of the limb, which we have described as most favourable to the production of the accident, the displacing force must necessarily be of rare application; and that the injury may occasionally be prevented, by the resistance which the muscles present to the rupture of the capsular ligament. It is probable, also, that its infrequency may in some measure depend, as we have already hinted, on the fortuitous nature of the circumstances which would seem to be necessary to its existence. We may regard it as a proof of the rareness of the accident, that there are few, if any, distinct cases of its occurrence mentioned on record. We have it on the authority of Hebenstreit†, that Evers had met with this Luxa-

* See Galeni in Hippocratem, Comment. l. c. 306.

† Ben. Bell's Lehrb. der Wundvrz. mit Zusätzen.

tion in a child two years old. The knee and foot were turned inwards, and the dislocated limb was longer than the other. Evers effected the reduction, by laying hold of the pelvis with the one hand, and the foot with the other; and while he made the extension, he inclined the limb inwards.

In June 1804, a man, aged 45, was admitted into the Royal Infirmary, under Mr. Law's care, who had dislocated his thigh bone by a fall, seven weeks before. Although, from the period which it had existed, changes were probably induced in the parts surrounding the articulation, which rendered the characters of the injury less marked, yet the luxation was obviously downwards and backwards. It was remarked, that if any difference existed in the length of the two limbs, the affected one was a very little shorter. The knee was turned slightly inwards, and the head of the bone could be felt posterior to the tuberosity of the ischium. The reduction was effected, without much difficulty, by extending the limb moderately, and turning the toes outward.

The difficulty of producing this luxation seems to have induced Petit to doubt even the possibility of its occurrence: "The luxation downwards and backwards," he observes, "is the most difficult of all, because the muscles always have a tendency to draw the thigh upwards and outwards. I even believe that all the luxations downwards, happen downwards and inwards, the bone placing itself

“ in the Foramen ovale. It is impossible, I think,
 “ that the head of the femur should rest on the os
 “ Ischium.”* Boyer, on the contrary, describes two
 species of this dislocation, one primary and the other
 secondary.† The occurrence of the primary species,
 with such symptoms as he has enumerated, we re-
 gard as a physical impossibility ; and we doubt ex-
 tremely the probability of a secondary species, where
 the thigh is much bent on the pelvis, ever succeed-
 ing to luxation upwards and backwards.

LUXATION UPWARDS AND FORWARDS.

During the application of the external force which
 occasions this luxation, to the knee, sole, or trunk
 of the body, the toes are turned outwards, and the
 thigh is in a state of abduction and inclined back-
 wards.‡ The Psoas magnus and Iliacus internus
 muscles oppose very little resistance to dislocation
 in this direction. The round ligament is torn

* Diseases of the Bones, p. 147.

† Lectures, &c. vol. ii. p. 167.

‡ This will be found to have been the position of the limb, in all those
 cases where the attitude of the person at the period he received the in-
 jury has been remarked. See Desault, Oeuv. Chir. tom. i. p. 412. Jour.
 de Medicine, tom. xvii. p. 152. Leveillé, Mem. de Chir. Pratique, p. 234.

across*, the capsular ligament is ruptured under the Ileo-pectineal eminence, and the head of the femur is thrown upon the origin of the Pectineus muscle. In this position, the neck of the bone is embraced immediately on the fore part, by the Psoas magnus and Iliacus internus muscles, which now pass over it as over a pulley, and by this circumstance are considerably extended. Over the same part, tho' more superficially than the former, the Rectus, Cruris and Sartorius muscles lie, and they also are somewhat stretched. The crural vessels run along the inside of the head of the bone. The Pectineus and all the Adductor muscles are relaxed. The upper margin of the Trochanter major presses against the brim of the acetabulum, immediately under the spinous process of the ilium. The posterior margins of the lesser Glutæi are twisted and elongated. The Pyriformis, Obturator internus, and Gemelli muscles are violently stretched across the acetabulum; while the Quadratus femoris and Obturator externus are relaxed.

The limb, in consequence of this luxation, is in general shortened, though the degree of shortening seems to vary remarkably in different cases. In

* In making this assertion, we do not hesitate to differ again from Bichat, who supposes that the rupture of the inferior root of the ligament is sufficient to allow luxation upwards and forwards. See Anat. Descript. t. i. 385. The extent of motion which this ligament admits, can only be accurately learnt by studying the articulation after the capsular ligament has been removed.

Desault's patient, it was nearly an inch :* In Deschamps-Lariviere's only the sixth of an inch :† In the first case related by Leveillé, it was half an inch :‡ while in a case which occurred to Mr. Law, in the Royal Infirmary of Edinburgh, the shortening could not be distinctly ascertained. We found in our experiments very little change induced on the length of the limb. Knowing these varieties, we are the less surprised with the observation of Hippocrates : “ Ad calcem verò, et in universum, crus æque longum conspicitur.”|| The variety may depend partly on original differences in the proportional size of the head of the femur and os innominatum in different individuals, and partly on the degree of extension or even laceration which the Obturator internus has suffered ; for it is by this muscle that the progress of the displacement upwards seems to be limited. The toes are turned outwards ; though there would seem to be varieties in this symptom also. In some cases, it is said to occur to as great an extent as in fracture of the neck of the femur ; in others, it has been remarked to be inconsiderable : yet altho', in some of our experiments, we have found that the inclination outwards of the foot was extremely slight, we cannot think the observation of Hippocrates generally true : “ Crus verò totum rectam positionem naturaliter servat, nec in hanc aut illam

* Oeuv. Chir. i. p. 413.

† Journ. de Medicine, xvii. 153.

‡ Memoires, &c. p. 235.

|| De Articulis, l. c. 312.

“ *partem inclinatur.*” The thigh is powerfully extended, and any attempt to increase this extension is accompanied with severe pain. The difficulty, however, which has been found to the moving of the thigh in other directions, seems to arise more from the acute pain accompanying every kind of motion in this dislocation, than from any physical resistance opposed by the muscles surrounding the joint. No symptom is more strikingly characteristic of the accident than the tumor formed by the head of the bone in the groin. On the inside of this tumor, the femoral vessels may be felt by the finger. The pulsations of the crural artery are sometimes visible to the eye. The Psoas magnus, Iliacus, Rectus Cruris, and Sartorius muscles, passing across the neck of the femur, will occasion a fulness and curvature on the upper and fore parts of the thigh; while the elongated state of the muscles inserted into the great trochanter will occasion a remarkable flatness of the hip. The compression of the crural nerves, by the head and neck of the bone, readily explains the acute pain which is felt in the groin and the numbness on the fore part of the thigh. Hippocrates, in enumerating the symptoms of this dislocation, observes :
 “ *Et urina supprimitur, magisque quam si articulus*
 “ *in aliam partem luxetur. Venit enim femoris caput*
 “ *maximè prope nervos magnam vim habentes, et*
 “ *in ingume prominet,*” &c.* In commenting on

* De Articulis, l. c. 312.

this passage, Galen remarks ; “ Nervos appellavit
 “ τόνους,” eos intelligens, qui cum venâ et arteriâ per
 “ inguen feruntur. Habent autem magnam vim,
 “ quum medullæ spinæ proximi sint, atque inde
 “ oriantur, unde initium sumunt nervi, qui ad
 “ vesicam feruntur. Quo fit ut femoris capite in
 “ hunc partem luxato, vesica quoque efficiatur, in-
 “ flammaturque, et reddere urinam nequeat. For-
 “ tasse etiam aliquando ob inflammationis magni-
 “ tudinem, quâve sicæ cervix affligitur, ubi muscu-
 “ lus est qui eam astringit, urina supprimitur. Eo
 “ quod inflammatis partibus excæcatum iter clau-
 “ datur*.” The words of Hippocrates would
 lead us to believe that suppression of urine was
 a symptom not confined to luxation upwards and
 forwards alone, but one which occurred more fre-
 quently in this species than in any other. It has
 been enumerated, however, as a symptom of this
 species only, by most succeeding writers. Flajani
 is the only author, as far as we have yet learnt,
 who mentions a distinct case of this luxation, in
 which difficulty of making water occurred as a
 symptom†. There was no tendency to any af-
 fection of the urinary organs in the five cases
 which have been collected by Leveillé, nor in the
 cases to which we have already alluded as treated
 by Mr. Law in the Royal Infirmary. Although,
 therefore, we regard the observation of Hippocrates

* De Articulis, l. c. 312.

† See Collez, d'Osservaz. di Chirurgia del G. Flajani, tom. i. 33.

as in part confirmed by Flajani, we think it correct to infer, that suppression of urine is not a symptom which either immediately, constantly, or even frequently, succeeds luxation upwards and forwards; but that it is one, which, in cases where reduction is long delayed after the accident has happened, may occasionally present itself as a mere sympathetic affection. Petit has enumerated swelling of the scrotum as a consequence of this luxation, a symptom which we do not find mentioned by Hippocrates; yet it also occurred in Flajani's case.

In effecting the reduction, the trunk of the body and pelvis are to be secured as in the two former species, the patient lying on his sound side. The leg is then to be fully extended on the thigh, the thigh brought as nearly as possible to a right angle with the pelvis; and an assistant, laying hold of the heel, and metatarsus, ought to make gentle extension of the limb. Another assistant, by means of a towel passed under the upper part of the thigh, is now to elevate the head of the femur, while the surgeon at same time, with the palm of his hand, presses it outwards and downwards. These motions, we believe, even though unaccompanied with any rotation inwards, will be found sufficient to replace the bone.

The direction in which we have suggested that the extention ought to be made, differs we are aware materially from what has generally been recom-

mended.* But as the Psoas magnus, Iliacus, and Rectus cruris muscles firmly embrace and bind down the neck of the femur on the fore part, we apprehend that the more the limb is pulled in the direction of the body, the more these muscles will be stretched, and the more difficultly will the head of the bone be moved from its situation. This we have always found to be the case in experiment on the dead body. If, on the contrary, the Rectus muscle be relaxed, by extending the leg on the thigh, and the Psoas and Iliacus, by bending the thigh on the pelvis, we believe that the principal obstacles to reduction will be avoided, and that little if any extension will be necessary in replacing the head of the femur. We can have little doubt that it was inattention to this circumstance, which alone created the serious difficulty experienced by Desault in the treatment of his case, and that this justly celebrated practitioner ascribed to the state of the capsular ligament, that resistance which in fact arose from the manner in which the extention was made. To the same cause we ought probably to attribute even the lesser difficulties met with in reduction by Deschamps-Lariviere, and by Leveillé, in his fourth case.

This luxation is less frequent in occurrence than the first species, though more so than the last which

* Pouteau appears to have erred as much in recommending extension to be made in a line with the body in this species, as in regarding it to be most eligible, to have it made at a right angle with the body in the two former species of Luxation. Oeuv. Posth. ii. 242.

we described. It is not a little remarkable, that, infrequent as it is, the cases of the accident already on record, are infinitely more valuable from the accuracy and minutness with which the symptoms and treatment are detailed, than any which we possess of the other species of Dislocation of the femur. Previous to the publication of that by Deschamps-Larvirere, Desault's was the only distinctly related case on record. To these Leveillé, in the memoir to which we have so often referred, has added three more, which occurred under Desault and Pelletan, in the Hospital de la Charite and the Hotel Dieu, at Paris. Mr. Law has kindly enabled me to subjoin the following case treated by him in the Royal Infirmary.

John Young, aged 44, falling with a burden of considerable weight on his back, dislocated his right thigh bone upwards and forwards. The toes were turned considerably outwards, but no difference of length in the limb could be distinctly ascertained. The head of the femur rested on the os pubis, and the crural vessels could be felt running along the inside of it. The patient complained of great pain, particularly on motion, in the hip and thigh.

The reduction was accomplished without much difficulty. The patient was laid supine on a table; and the trunk of the body and pelvis were secured by two girths, passed diagonally from each groin across the back and belly to the opposite shoulders, and by a third resting on the crista ilii. The limb

was extended, by means of a lac applied above the condyle of the femur, and the head of the bone, elevated by another lac, passed under the upper part of the thigh, was pressed downwards and outwards by the hands of the surgeon. These motions were assisted by rotation inwards of the toes.

In ten days the patient was dismissed, cured.

LUXATION DOWNWARDS AND FORWARDS.

The head of the femur most easily ruptures the capsular ligament towards the anterior and inferior part, when a violent and sudden force is applied to the trunk, knee or sole, during the time that the thigh is in a state of great abduction and rotated greatly inwards. The laceration however of the capsular ligament alone, will not allow the head of the bone to pass over the brim of the acetabulum. An accurate examination of the anatomy of the hip joint, will shew that a complete rupture of the interarticular ligament is essentially necessary to the production of this as well as of the other three species of luxation. Those who are minutely acquainted with the structure of this ligament, will not hesitate to regard as purely hypothetical the assertion, that it may admit of elongation, to such an extent as will allow the head of the bone to escape out of its socket in any direction. If they

who have once suffered luxation downwards and forwards, are rendered very liable to a return of the accident, this ought not to be ascribed to any relaxation or elongation of the round ligament; for we have reason to believe, that frequent luxation would not be a necessary consequence even of the total deficiency of this ligament. Two instances are recorded by Bertin*, where, on dissection after death, the round ligament of the left hip joint, in the one case, and of both hip joints in the other, were discovered to be wanting, and yet no inconvenience was experienced from these deficiencies, during the life of the individuals in whom they existed.

The head of the bone forced out of its socket rests on the belly of the Obturator Externus muscle in the Foramen ovale. The Adductor Brevis, superior portion of the Adductor magnus, and the external Obturator muscles are relaxed. The Psoas magnus, Iliacus and Pectineus are violently stretched. The Adductor longus, and inferior part of the Adductor magnus, are considerably elongated. The Piriformis and the anterior portions of the lesser Glutæi are a little extended. The Obturator internus is relaxed.

The affected limb is longer than the other †, and

* Osteologie, t. iv. p. 248.

† There is surely some inaccuracy in that part of the case related by Mr. Hey, where he states that the affected limb appeared to be three or four inches longer than the other. See "Practical Observ." p. 318.

in a state of abduction. The leg is a little bent on the thigh, and the toes are turned slightly outwards. The head of the bone, although it cannot be distinctly felt through the integuments and Pectineus muscle, occasions a fullness in the groin and upper part of the thigh. There is an unusual flatness of the hip, and a considerable hollowness in the natural site of the great Trochanter. The Adductor magnus and the Gracilis may be felt on the stretch through the integuments on the inside of the thigh. The situation of the head of the bone renders rotation inwards impracticable, and rotation outwards, as well as extension or adduction of the limb, are made very difficult, from the elongated state of the Pectineus, Psoas, and Iliacus muscles. The only motions which the limb admits of, are flexion and abduction.

In the reduction of this luxation, the extension and counter-extension ought to be made exactly as in the last species; and while the surgeon, by means of a towel passed under the upper part of the thigh, pulls the head of the bone upwards and outwards, the assistant favours its return into the acetabulum by bringing the knee and leg quickly towards the sound side, and rotating the toes gently inwards. Where the accident has existed for some time, a considerable degree of extension may be necessary in the reduction: In recent cases, the less that is employed, probably, the better. M. Maison-neuve, a surgeon of talent and veracity, assured Pouteau, that

he had effected reduction in such cases without the aid of extension. Having first bent the thigh to a right angle with the body, he pushed it as near as possible to the abdomen, inclined it outwards, and then brought it quickly inwards towards the sound limb. This mode of treatment corresponds very closely with that which had been recommended by Wiseman in young patients and those of tender constitutions.* Where however extension is requisite, Wiseman and others had recommended, that the patient should be laid on his back, and the limb pulled in a line with the body. It was in this manner that Mr. Travis employed the extending force, in the case which he treated successfully.† Dr. Kirkland‡ and Pouteau suggested an improvement on the mode of reduction, by directing, that the extension should be made while the thigh was at right angles with the trunk; yet it does not appear that either of these authors understood very precisely how this direction of the limb facilitated the cure. The method practised by Mr. Hey, was founded, as he himself informs us, on the directions given by Dr.

* "Chirurgical Treatises," book vii. chap. 8.

Hippocrates seems to have been perfectly aware that this species of luxation was reduced with much greater facility in some individuals than in others: "Nam femur quibusdam absque ulla preparatione revertitur. Si quidem levi adhibita intentione, et exiguo motu manibus in suam sedem compellitur." De Articulis, l. c. 334.

† Medical Observ. and Inquir. vol ii. p. 99.

‡ Observations on Mr. Potts' "General Remarks," &c.

Kirkland. Although, however, it was successful in three cases which came under his care, we think it susceptible of improvement in several particulars. In the first place, by making the extension as he has directed, with the leg forming a right angle with the thigh, we keep the Rectus muscle extended ; nor can we so easily use the whole limb as a lever, to incline the head of the bone outwards : Secondly, by applying a lac above the knee, we stimulate muscles to spasmodic contraction much more readily in this species of luxation than in any other : Thirdly, when the patient is seated upright, the assistant operates to great disadvantage in pulling the head of the bone outwards : And, lastly, we cannot perceive how rotation of the leg inwards or towards the sound side, is calculated to bring the head of the bone directly towards the acetabulum. None of these objections appear to be applicable to the method which we have recommended.

There is reason to suspect, that surgical writers have been induced to describe this dislocation as an extremely common accident, less from the positive frequency of its occurrence, than from studying in the skeleton the form of the inner part of the acetabulum. It seems generally acknowledged to be much more frequent than the second or third species, yet there may be room to doubt whether it is even so common as the luxation upwards and backwards.