Lyme Surgical Fellowship.

University of Edinburgh.

August, 1886.

"On partial dislocations of the radius peculiar to young children."

Reginald H. Lucy.
M.B., C.M., Edin. (1885.)

House-Surgeon.
London Hospital, E.
"On partial dislocations of the head of the radius peculiar to young children."

"The lesion I am about to describe has gone by various names; clinically the cases have been identical in their symptoms but the explanation of the pathology and seat of lesion are numerous and considerably at variance."

This lesion is so very commonly met with in practice—hospital and private—that every practitioner should understand thoroughly the mechanism of its production, its symptoms, and method of reduction.

The ordinary text books in the English language do not even mention the existence of such a lesion, if I except Dr. Wheelock's "Minor Surgery & Bandaging.

It is this fact & the obscurity of the pathology & seat of lesion that I have attempted to put forward my views & results of careful observation on this subject.

The cases are selected from the practice of the London Hospital during my period of office as Receiving Room Officer & House Surgeon there. The average no. of well-marked cases met with here is 3 or 4 per week.

Nomenclature.

It has been called "pulled elbow" & "obscure sprain of elbow joint," but believing with Mr. Jonathan Hutchinson, Jr., that the injury is a partial dislocation downwards of the head of the radius out of the fossa of the annular ligament, I have so styled..."
literature on the subject.

(1) The earliest reference to the subject was made, I believe, by a Dr. Schlechter, a German observer, but so far I have been unable to find the original of the paper—only a reference to it. 1850.

(2) The next reference was made by Mr. Goyrand in a paper read before the Surgical Society of Paris in 1861, in which he maintained that the lesion consisted in a displacement of the interarticular fibrocartilage of the wrist, in front of the carpal extremity of the ulna.

(3) In the 7th Edition of Neate's "Minor Surgery and Bandaging," the author's view is that sometimes the lesion is at the wrist joint, at other times at the elbow. His treatment was fracturing the bone and pinning it steadly.

(4) Mr. Langman in the British Medical Journal for 1882, described the lesion as a dislocation of the radial head forward and outward. His treatment was supination and extension of forearm.

(5) Mr. Jonathan Hutchinson, Jnr., in the "Annals of Surgery" for August 1885, described the lesion accurately according to my view but left untouched several points which I have since elucidated.
It was curiously enough, in August 1885, before I knew Mr. Hutchinson that my attention was first drawn to these cases. I then communicated with him. I collected cases which are published in part in the British Medical Journal for Jan. 2, 1886.

6. In the British Medical Journal for Dec. 2, 1885, Mr. Lindeman again wrote on the subject, but in this paper his imagination as to deformities, etc., has in my opinion run riot.

7. Mr. Brindley James in the B. M. J. for Jan. 2, 1886, generalizes on the subject from one particular instance. I agree with Mr. Lindeman.


9. M. Villeneuve in his "anatomie topographique" supports M. Fournand's view [op. citat. (7)], but in the chapter on injuries at the elbow joint, does not mention the lesion under consideration.
It is a lesion which some would include under the generic term “sprain,” while others would call it a “subluxation” or “partial dislocation” of the radial head.

I wish to prove now:

(1) That the lesion is situated at the elbow joint, both by experiments on the cadaver and by close observation of many selected cases.

(2) That it never occurs in children above the age of 7 years.

(3) That the cause of the lesion is almost invariably constant—viz.: dragging or lifting the child up by one hand or forearm when in the position of suspension.

(4) That no obvious deformity either at the wrist or elbow has been observed.

(5) That whilst the lesion remains unreduced the child’s arm hangs helpless by its side, extended and semiflexed; the child refuses to move the arm and when passive motion is attempted the child cries out.

(6) That the mode of reduction is simple and effective in all cases. I have so far met with, viz.: one movement of full flexion and pronation.

(7) That reduction is accompanied by a distinctly palpable, but rarely audible, ‘crack’ or ‘click’ at the moment of extreme flexion and pronation.

(8) That the lesion may be localized in or near the elbow by palpation i.e. by placing the finger over the head of the
That recurrence of the lesion under
similar conditions has happened in some
few cases.

I will now proceed to prove my points
severally, at the same time criticizing
the views of the various authors who
have written on the subject.

In all the cases which I have yet
met with in practice I have always
found the lesion uniform in its seat,
mode of production, symptoms & reduction.
In one out of several cases on the
cadaver I have been able to produce
the lesion figured in Plate I, by first
manipulating the upper extremity till
 rigor mortis had disappeared & then
forcibly drawing on the hand in the unfric
inated position, at the same time causing
extending above the elbow joint.
This procedure corresponds with the
method of production of the lesion in
the living subject; it need hardly be
pointed out the insignificant part the
ulna plays in the formation of the wrist
joint & that traction on the hand would
be transmitted almost wholly through the
radius to the elbow joint.
Again the hand is usually separated
while the force is applied, no one thinking
of dragging a child up by a tautened
hand.
In the cadaver traction so made
Direction of ejection of elbow bones from mortise in a child aged 2 years, showing rupture of capsule, lift, & folding of fat. Position is angle between capitellum & radial head.
produce a "snap" or "crack" + in more than one case during life the persons
who brought the child for treatment voluntarily stated + without leading que-
tions that they heard a "crack" at the
time of the accident occurring.

The noise, or more correctly, feeling
of snapping may be produced over + over
again in the cadaver after reducing the
lesion each time by pronating + flexing
as shown in the sketch. the members
or part of the capsule lifted, stretching
from the lower border of the orbicular
ligament to the periosteum of the radial neck
is torn through + the orbicular ligament
slipping upward, occupies the angle between
the edge of the radial head + the capitellum
as will be seen practically no move-
ment downward or outward of the radial head follows
if it did the amount of such displace-
ment would be represented by the depth
of the cup in the radial head.

The being very shallow in the class
of children in whom the lesion occurs
the extravagant descriptions of various
authors as to visible deformities are
totally uncalled for inaccurate.
[ Lindeman op. citat. (4) + (6) Brindley
James op. citat. (7). ]

Practically then the lesion seems to be
a rupture of the connections of the
orbicular ligament with the radial neck
below, followed by a slipping upward
of this ligament, rather than any appreci-
able separation of the radial head from
the capitellum.
Plate II.

Light tube of 1 & 1/4 inches in diameter, as shown in the (stage) drawing, attached to the test tube. The limits of the test tube are indicated by a short line below it.

(If the part of the shell nearest to a particular form or section cannot be seen from (a), even from the front, draw natural size.)
## Table of Cases

<table>
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<th>No.</th>
<th>Age</th>
<th>Sex</th>
<th>Lesion &amp; the way produced</th>
<th>Mode of Reduction</th>
<th>Whether returned</th>
<th>Side of lesion</th>
<th>If well developed or not</th>
<th>Remarks</th>
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<td>3½</td>
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<td>&quot;</td>
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<td>1½</td>
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<td>&quot;</td>
<td>&quot;</td>
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<td>4</td>
<td>F</td>
<td>&quot;</td>
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<td>R</td>
<td></td>
<td></td>
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<tr>
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<td>2½</td>
<td>F</td>
<td>&quot;</td>
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<td>L</td>
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<td>&quot;</td>
<td>&quot;</td>
<td></td>
<td>R</td>
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<td>L</td>
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F = female; M = male; F + P = flexion & formation—once the neck of time, these movements were performed. R = right; L = left. S = supination extension.
These appearances are consistent with the absence of any obvious deformities in the living subject.

As a marked contrast to showing that the lesion cannot be produced in children of a certain age the following extracts are cited.

Feb. 17, 1886. (a) Girl, aged 6 yrs. who died of tuberculosis; she was extremely emaciated; after rigor mortis had been worked off by manipulation no amount of force in any portion of the forearm would produce this lesion or any lesion at the elbow joint.

(β) The same happened in a male child aged 7 yrs.

(γ) In the case of an 8th month foetus it was equally impossible by any amount of force, however applied, to rupture the carpal bone, the radial neck being here much smaller than the cartilaginous head as shown in Plate II, probably because the shaft had not yet begun to thicken in proportion to the epiphyses. Loosening of the epiphyses though may be produced by traction applied to the hand of cadaver, epiphysial thickness is about 3/16 in. Later in life the neck thickens and becomes at 7 years almost of the same diameter as the radial head; hence the great liability of the left to slip up at this age.
(2). As will be seen from the table of cases, no one case occurred in a child above the age of 11 years. This is borne out by experiments on the cadavers \[\text{P (1)}\]; by anatomical considerations of size of head, neck, of radius relatively to each other; by the disproportion between the weight of the child and the strength of its lift; before 4 years of age thereabout; the explanation of the non-occurrence of the lesion beyond that age must be the greater strength of the ligaments.

(3). In almost all cases the mode of production of the lesion was uniform viz: forcible lifting or dragging the child up from the floor etc., by grasping one supinated hand or forearm.

Obviously a good deal of force is applied at the elbow. Thus, when we consider that the child’s body at the time is suspended by one upper extremity (often jolted at the same time). Then the parts under consideration, being presumably the weakest, give way. The child as doubt also resists the movement by putting into action several muscles, among which is the biceps, whose tendon in children has an attachment to the orbicular lift. And would tend as a counter extending force to drag the orbicular lift upwards.

Additional reasons have been given in \text{P. (1)}. \[\text{P. (1)}\]
In no case have I yet seen
been any obvious deformity
about the elbow; there is a feeling
of resistance when flexion is made at
the commence ment of pronation. Either
the forearm bones included actual dis-
locations of the radial head or else his
imagination has been drawn on (op. citat).

I cannot either subscribe to the
views of either Mr. Filloux or Mr. Boyard
[op. citat. (2) + (10)]. I have carefully
examined the wrist of each case before
reduction I found no differences in the
level of the styloid processes as compared
with the sound side nor any deformity
such as one would expect in the
lesion they describe.

These conclusions are supported by
the ease on the cadaver.

The symptoms appear to be identically
described by each author as the same
in all cases although I have never seen
the forearm semiflexed, a condition men-
tioned by Mr. B. James (op. citat).

The child who before reduction
would not respond to such a strong
stimulus to grasping as the sight of a
penny will stop crying & race & bend
the arm freely after reduction.

The method of reduction is to grasp
the hand, fully flex the forearm, at the
same time pronating steadily & fully
One such combined movement will culminate in a snap or crack & free movement is restored to the radius.

The "snap" may be analogous to the cracking noise heard when the femur is separated from the acetabulum in disarticulation or when it is again forced into that cavity.

Reduction may also be effected in the supinated & extended position but I have found that 3 or 4 such movements have been required & sometimes I have failed altogether. But on resorting to the pronation & flexion one such movement has succeeded in eliciting the click & free movement.

One factor in the ease of reduction by flexion etc., is probably the relaxation of the biceps tendon so allowing the orbicularis to slip down again.

Now in the extended position the tendon would be tense.

Again the shape of the part of the radial head presented to the lilt. During supination & pronation may be another factor.—During supination the part of the radial head opposed to the curve of the orbicularis lilt is kept to its upper edge & angle while during pronation that part of the head in a corresponding position is shallow & has its upper edge rounded off. Hence the lilt more easily slips down the latter part of the head.
The explanation of these sounds has been put forward (P. 6) — rather than two bones striking together as has been suggested. In a quiet room no doubt a click might be heard.

The click may be felt easily as stated over the radial head.

My usual treatment has been to place the arm in a splint for a few days with instructions to bring the child back at the end of that time; no child has been brought back, but in one solitary case did recurrence happen — 2 times in all.

Mr. Hutchinson mentions (op. citat. (5)), as an after result a couple of cases, but none such have yet come under my observation.