A Comprehensive Epidemiological Study of Perthes Disease in Duhok Governorate

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Abstract

Background: Perthes disease has been recognized as a public health problem in Iraq, in general, and in Duhok governorate, Iraqi Kurdistan region in particular, many aspects of which are not yet clear.
Objectives: This study was conducted to deal with the importance and effect of various variables which might have influence in perthes disease occurrence.
Materials and Method: A cross sectional study design was performed and continued for 4 month and included 170 non-randomized consecutive samples collected from the early detection of childhood disabilities center (E.D.C.D.C.) Duhok. Patients' registers from the center were used to collect data concerning perthes cases.
Results: The results indicated that males mainly suffer (68.8%), (41.2%) of perthes cases occur in winter, left sided affection was more occurring (45.9.1%), patients aged (7-11years) were the highest (42.9%), consanguious parents constitute (55.3%), the mother's age group of (26-35 years) had the highest occurrence (58.2%), illiterate mothers (62.4%) were the highest, illiterate fathers were highest (39.4%), deliveries conducted in hospitals constituted significantly the highest rate (78.2%), the highest rate observed was in families having (1-5) children (51.8%), the group with no other disabled children within the same family was the highest (87.1%), Duhok city showed the highest incidence (38.2%), mothers with blood group O^{+ve} were the highest (44.1%), mother's with normal deliveries were highest & finally patients with no complications were the highest (94.1%).
Recommendations: It is recommended that all infants with positive risk factors and with positive family history of perthes must be examined carefully, as well as establishment of perthes screening units in all maternity hospitals in Duhok governorate.
Keywords: Perthe's disease, Duhok, children.

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Introduction

Perthes disease is also known as LCPD (Legg-Calvé-Perthes disease), Legg disease, Legg's disease, Legg-Perthes disease, Calvé-Perthes disease, coxa plana, osteochondritis deformans juvenilis, pseudocoxalgia, quiet hip disease. It is the name given to idiopathic osteonecrosis of the capital femoral epiphysis of the femoral head [1].

It is characterized by a temporary loss of blood supply to the hip causing its death. The area becomes intensely inflamed and irritated. As a result the bone becomes necrosed [2, 3, 5, 6]. Sometimes, lt continues into adulthood [7, 8, 9, 10].

Males are affected 4-5 times more often than females. In USA, only about one in four are girls. About 5% of all diagnosed develop

the disease bilaterally. The age of diagnosis is usually between 2 and 12 years old, with the average age of 6 [1, 4].

Caucasians are affected more frequently than other races; males are affected 4-5 times more often than females, suggesting a partial sex-linked genetic inheratance of the syndrome. It is most commonly seen in persons aged (3-12) years, with a median of 6 years of age. In 10 to 20 per cent of cases, both hips are affected. In UK, the incidence is higher, with Ireland having the highest percentage. It is also found in Latin Americans, Asians and Inuit Indians [7, 8].

Perthes disease is seen in children between 4 years and 10 years of age. It is five times more common in boys than in girls [10].

The cause is unknown. It occurs due to an interruption of the blood supply to the head of the femur, part or all of which softens and is deformed by weight bearing [1, 3, 4].

Genetics does not appear to be a determining factor, though it may be involved. When the disease is genetic in origin, it typically runs along the male line [7].

Recent research has suggested that Perthes' disease may be linked to a subtle problem with blood clotting [8].

Poor diet, health and living conditions may be considered as contributory factors. There are instances of perthes showing in more than one generation of a family and also of siblings who get it [12].

Materials and Method

To describe the various epidemiologic features and the possible risk factors associated with perthes disease in Duhok governorate.

Study samples were collected from early detection of childhood disabilities center (EDCDC), Duhok, Iraqi kurdistan, which is situated in Dohuk city, rather than from private clinics, because of easy accessibility, and it ensures a large sample size with a wider geographical distribution as that centre is the only consultant centre in Dohuk receiving referred cases from different specialists in Dohuk governorate. To achieve this study's aims, a cross sectional study design was performed and continued for 4 months from (20^{th} October 2008 till 20^{th} February 2009). The target population involved in this study was the entire cases who attended the centre during the period from (1^{st} January 1998 till 30^{th} December 2008) with a final diagnosis of perthes disease and all were from Dohuk governorate. Their number was (194), but only (170) cases were chosen. Number of (24) cases were excluded due to incomplete data or missing files. Patients registers or records from (E.D.C.D.C.), Duhok, were used to collect informations about perthes patients which include the following: Gender, location of birth, patient's age group, season of birth, mother's literacy, father's literacy, parent's consanguinity, defect side, no. of children in the family, mother's age group, mother's blood group, family H/O perthes disease, presence of other congenital deformities, presence of complications & finally type of delivery conducted.

Statistical Analysis: Data entry and tabulation were conducted in computer using Microsoft Office 2003; the analysis was done using SPSS Version 11 for Windows.

Results and Discussion

A- The effect of gender

The study revealed that males mainly suffer from perthes (117=68.8%) compared to females (53=31.2%) as shown in fig.1.

This result is nearly identical to what most of researchers concluded in their studies [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16].

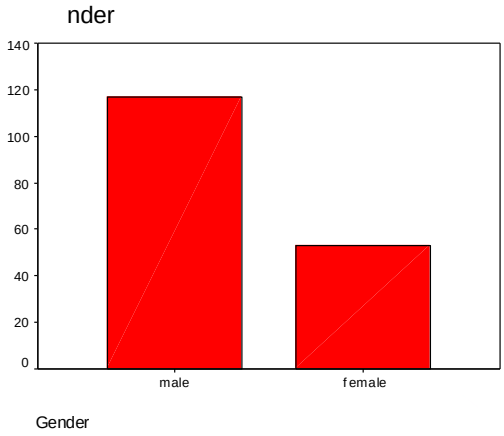

Figure (1): Distribution of perthes cases by gender.

B- The effect of season of birth

Fig.2 shows that highest occurrence of perthes cases occur in winter (70=41.2%), then in summer (41=24.1%), in autumn (32=18.8%) and finally in spring (27=15.9%).

It is worthy to state that no researcher in Duhok has mentioned yet the possible importance of this parameter, which is being investigated for the first time.

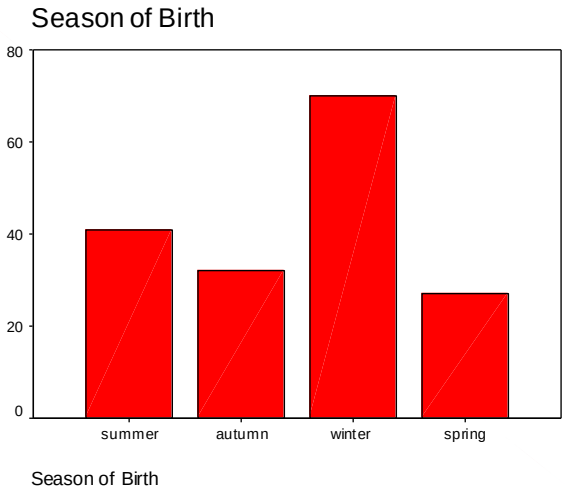

Figure (2): Distribution of perthes cases by season of birth

C-The effect of defect side

Fig.3 concludes that left-sided cases were highest in occurrence (78=45.9%), right-sided cases were (74 =43.5%) while bilateral affection was minimum (18=10.6).

This result does not differ much from what other researchers found in their previous studies [1,2,3,4,6,7,10,12,14,15,16].

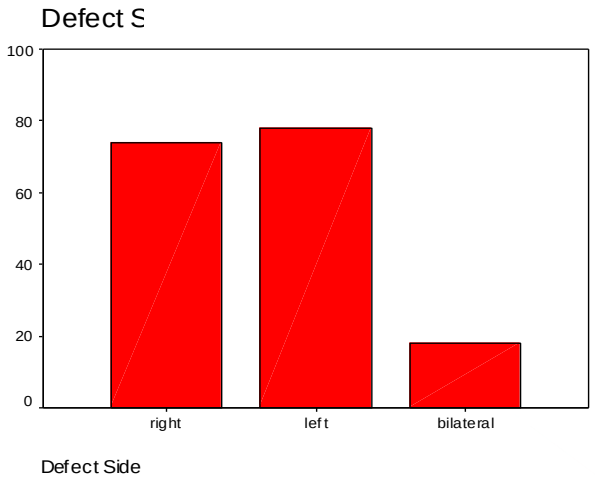

Figure (2): Distribution of perthes cases by defect side

D-The effect of age (Date of birth)

The study revealed that patients aged (7-11) years were the highest (73=42.9%), those aged (3-6) years were (54=31.8%), patients aged > 12 years were (38=22.4%) & finally children aged (0-2) years were (5=2.9%) as shown in fig.4.

This result, too, does not differ much from what other researchers found in their studies [1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19].

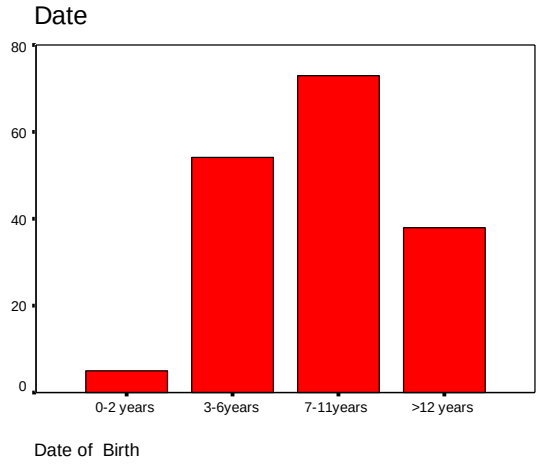

Figure (4): Distribution of perthes cases by date of birth (age).

E- The effect of parent's consanguinity

Tab.5 indicates that the highest rate was in consanguineous parents which constitute (94=55.3%), non-consanguineous parents constitute (76=44.7%).

This result matches previous studies which concluded that 1st.,2nd.& and 3rd. relatives are at risk of perthes cases [14], which appeared also significant with current study and that may be due to wide spread of consanguineous marriage in our region in urban community followed by non-consanguineous marriage. Heredity may play a role in this regard.

Table (5): Distribution of perthes cases by Parent's consanguinity.

Parent's Consanguinity	Frequency	Percent
consanguineous	94	55.3
Non consanguineous	76	44.7
Total	170	100.0

F- The effect of mother's age group

This current study refers for the first time that mother's age is related to occurrence of perthes cases. Fig.6 revealed that the age group of (26-35 years) had the highest occurrence (99=58.2%), age group of (36-45 years) was (50=29.4%), age group of (>45 years) was (12=7.1%) and finally the age group of above (16-25 years) was only (9=5.3%) respectively.

This may be related to the marriage age of girls in our region & requires further studies by other fellow researchers in the region & abroad. No researcher in Duhok has mentioned yet the effect of this possible parameter.

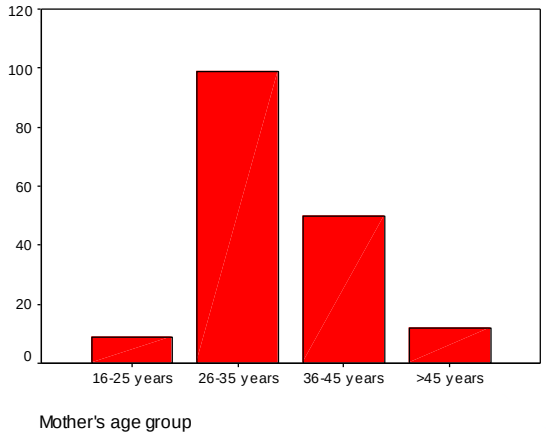

Figure (6): Distribution of perthes cases by mother's age group.

G- The effect of mother's literacy

It is shown in fig.7 that illiterate mothers were the highest (106=62.4%), mothers with primary education (44=25.9%) differ from mothers with secondary education (12=7.1%) and those with tertiary education (8=4.7%) which were less in occurrence respectively.

This may be related to the early age of marriage among younger females in combination with educational negligence, a new fact which is not yet mentioned in references by other fellow researchers.

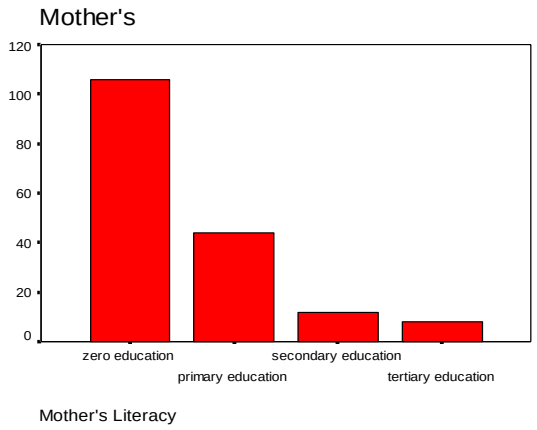

Figure (7): Distribution of perthes cases by mother's literacy

H- The effect of father's literacy

Fig.8 illustrates that illiterate fathers constituted (67=39.4%), while fathers having primary education were (56=32.9%), fathers with secondary education (24=14.1%) and fathers having tertiary education were (23=13.5%) respectively.

This may be due to occupation of fathers which make them busy or careless about their families.

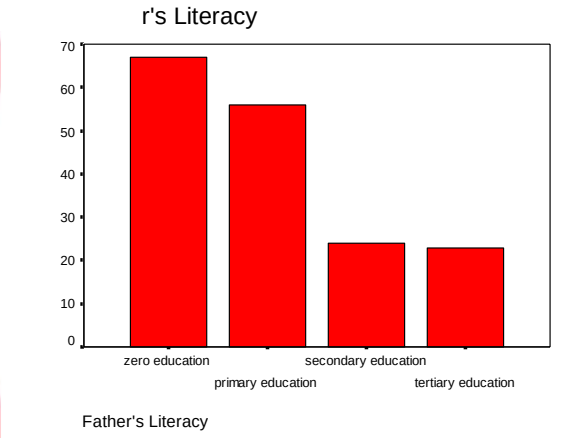

Figure (8): Distribution of perthes cases by father's literacy.

I- The effect of location of birth

Fig.9 showed that deliveries conducted in hospitals constitute the highest rate (133=78.2%), while those delivered at home with help of midwives were much lower (37=21.8%).

This shows clearly the wide-spread approach of pregnant women in our region to be delivered at hospitals rather than being delivered at home with help of midwives. The haste with which deliveries are conducted at hospitals, lack of enough experience of both medical & paramedical staff may be the cause behind the high rate of perthes cases in hospitals deliveries. No researcher in Duhok has mentioned yet the effect of this possible parameter.

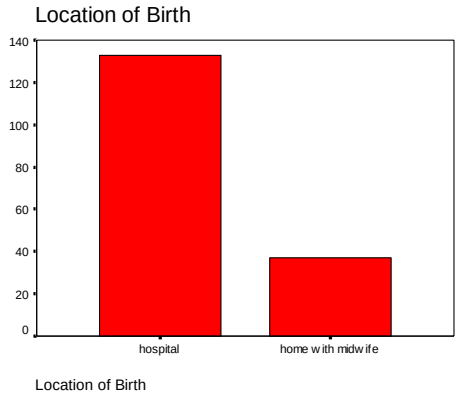

Figure (8): Distribution of perthes cases by location of birth**.**

J- The effect of number of children in the family

It is found in fig.10 that the highest observed rate was in families having (1-5) children (88=51.8%), then in families having (6-10) children (70=41.2%), and in families having ≥ 11 children (12=7.1%) respectively.

This can be attributed to the maternal uterus & may be explained by the decrease rate as a result of subsequent pregnancies and deliveries as the mother's uterus gets more extended, or mothers get more acquainted with following pregnancies. No other fellow researchers mentioned yet the effect of this possible parameter.

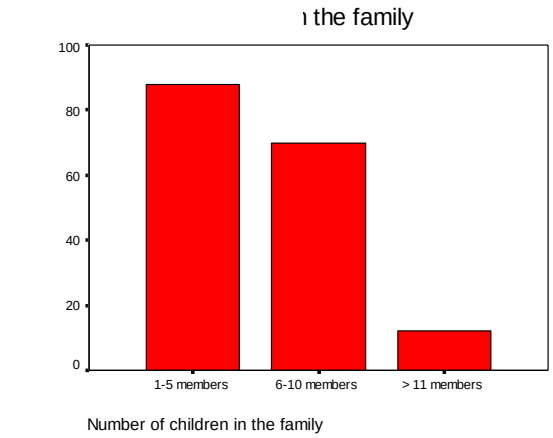

Figure (10): Distribution of perthes cases by no. of children in the family.

K- The effect of presence of other disabled children within the same family

Tab.11 reveals that the group of non-existing disabilities was the highest (148=87.1%), while group with DDH (Developmental dysplasia of hip joint) was less common in order of frequency (22=12.9%).

This result confirms to some extent what another study stated that DDH may be observed in other children within the same family [16].

Table (11): Distribution of perthes cases by no.of other disabled children within same family:

Presence of other disabled children within the same family	Frequency	Percent
Non	148	87.1
DDH	22	12.9
Total	170	100

L- The effect of geographical distribution

Tab.12 shows that the highest group of perthes cases was in Duhok city (65=38.2%), then in Zakho city (33=19.4%), both cities of Sumail & Amedy (18=10.6%), Atrush city (14=8.2%), Akre city (13=7.6%) & finally in Zaweeta city (9=5.3%) in order of frequency.

This current study is the first survey to be performed in Duhok governorate.

Table 12: Distribution of perthes cases by geographical distribution.

Geographical Distribution	Frequency	Percent
Duhok	65	38.2
Zakho	33	19.4
Zaweeta	9	5.3
Sumail	18	10.6
Akre	13	7.6
Atrush	14	8.2
Amedy	18	10.6
Total	170	100.0

M-The effect of mother's blood group

Fig.13 reveals that the highest mother's blood group was O+ve (75=44.1%), A+ve (35=20.6%), AB+ve (20=11.8%), B+ve (12=7.1%), A-ve (11=6.5%), AB-ve (8=4.7%), O-ve (6=3.5%)& finally B-ve (3=1.8%) in order of frequency.

This survey again is the first to be performed in Duhok governorate concerning mother's blood group of perthes patients.

Many researchers mentioned the possible role of blood groups in etiology of perthes disease, attributing the cause to a possible genetics, or subtle problem with blood clotting [5, 6, 10, 16].

However this important parameter should never be ignored & thorough investigations by other fellow researchers must be completed worldwide.

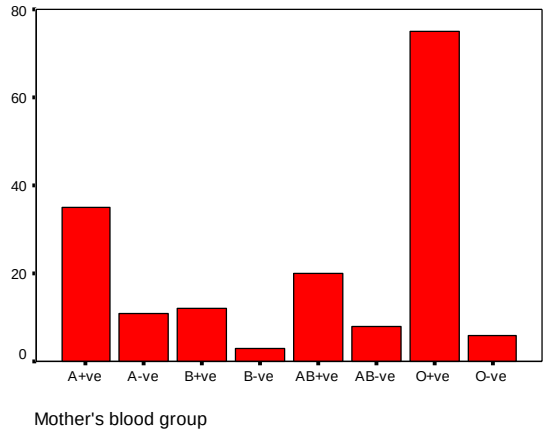

Figure (13): Distribution of perthes cases by mother's blood group.

N-The effect of type of delivery

Tab.14 reveals that the group of mothers with normal deliveries was the highest (170=100%) & none of them needed cesarean section.

This survey is the 1st. to be performed in Duhok governorate & to be kept at disposal of other researchers.

Table (14): Distribution of perthes cases by type of mother's delivery**.**

Type of delivery	Frequency	Percent
Normal	170	100
Total	170	100.0

O-The effect of presence of complications

Tab.15 shows that the group of patients with no complications was the highest (160=94.1%) while group with AVN (Avascular Necrosis) was less common (10=5.9%).

Table (15): Distribution of perthes cases by presence of complications**.**

Presence of Complications	Frequency	Percent
Non	160	94.1
AVN	10	5.9
Total	170	100.0

Conclusions

The current study reveals the following conclusions:

1-Males with perthes cases were found to be higher than females.

2-Seasons play an important role in perthes cases occurrence, being especially highest during winter.

3-Left perthes cases were confirmed to be the highest.

4-Patients aged (7-11) years were the highest.

5-Consanguineous parents group were seen to be more related with perthes cases followed by non-consanguine group.

6-Patients born to mothers aged (26-35) years were found to be highest with perthes cases.

7-Non-medical factors such as mother's and father's literacy were noticed to be of importance in perthes occurrence, being highest in parents with zero education (illiterate).

8-perthes cases were found to be highest in deliveries conducted at hospitals.

9-Regarding number of children in the family, the group of (1-5 members) was highest.

10-Regarding presence of other disabled children within the same family, it is revealed that the group of non-existing disabilities was the highest.

11-Highest rate of perthes cases was in Duhok city.

12-Highest rate of perthes cases was detected in children born to mothers with (O+ve) blood group.

13-All mothers of surveyed perthes patients were delivered normally & none of them needed cesarean section.

14-The group of perthes patients with no complications was the highest.

Recommendations

1-All infants with positive risk factors & with positive family history of perthes must be examined carefully, and multiple examinations are recommended. Then comes the role of family physician in examining for perthes, early diagnosis and referral.

2-Establishment of perthes screening units in all maternity hospitals in Duhok governorate.

3-Health education of mothers about signs and symptoms of perthes.

4-Different Medias should be used for public education such as newspapers, radio, TV programmes. Posters, etc. The role of NGOs should be taken into consideration and must be encouraged.

5-All suspected cases should be x-rayed.

6-Further studies concerning role of blood groups should be continued by other researchers.

7-Non consanguineous marriages should be encouraged; consanguineous marriages should be discouraged in the society.

8-Campaigns of illiteracy eradication should be waged for both illiterate parents.

References

[1] Eric, k, Francisco T, Tom S, John D H and Rick K : Legg-Calve-Perthes Disease, WWW.Emedicine, 2006: 1-5 (internet).

[2] WWW. orthoinfo.aaos.org.: American Academy of Orthopaedic surgeons : Perthes Disease, 2007: 1-3.

[3] WWW.nonf.org.: Legg-Calve-Perthes Disease, 2007: 1-4.

[4] University of Virginia Health System: Legg-Calve-Perthes Disease, 2007:1-2.

[5] WWW.Wikipedia.org.: Legg-Calve-Perthes Syndrome, 2008:1-3.

[6] Rob, H and Trisha M. Perthes Disease, WWW.Perthes.org.uk, 2006:1-2.

[7] WWW.Perthes.org.uk: Perthes Disease, 2007:1-3.

[8] WWW.ortho.info.org : American Academy of Orthopaedic surgeons, Perthes Disease, 2007, P. 1-2 (internet).

[9] Davies, A G. Perthes Disease, Orthopaedic Department, Sheffield Children's Hospital, Sheffield, UK, 2008:1.

[10] Demko, J and Mclaughlin R. Developmental orthopaedic Disease, 2005:1-8.

[11] Apley, AG and Solomon, L. Legg-Calve-Perthes Syndrome, Concise System of Orthopaedics and Fractures, 2nd. edition, the University Press, Cambridge, UK, 1998: 184-186.

[12] Lovell, WW and Winter RB. Legg-Calve-Perthes Syndrome, Paediatric Orthopaedics, 2nd. Edition, J.B. Lippincott Company, Philadelphia, USA, 1986:750-760.

[13] Skinner, HB. Legg-Calve-Perthes Disease, Current Diagnosis & Treatment in Orthopaedics, 2nd.edition, MaGraw Hill Company, USA, 2000:542-547.

[14] Harris, NH. Perthes Disease, Postgraduate Textbook of Clinical Orthopaedics, John Wright & Sons Limited, UK, 1983:110-119.

[15] Apley, AG and Solomon, L. Perthes Disease, Apley's System of orthopaedics and

Fractures, 6th. Edition, Butterworth & Co Ltd., UK, 1987:258-262.
[16] Koval, KJ. Legg-Calve-Perthes Disease, Orthopaedic Knowledge Update, American Academy of Orthopaedic Surgeons, USA, 2005:738-742.
[17] WWW.help@perthes.org.uk : Perthes Disease, Nov, 2007:1.
[18] Zieve D, Juhn G, Eltz DR and Stacy KA: Legg-Calve-Perthes Disease, WWW.Midlineplus, 2008:1-3.
[19] Adams J G and Hamblen D L. Perthes Disease, Outline of Orthopaedics, 13th.edition, Churchill Livingstone, Singapore, 2001:312-316.
[20] Yeoman PM and Spengler D M. Perthes Disease, Orthopaedic Practice, Butterworth Heinemann, UK, 1996:40-47.