




Available online at  
 ScienceDirect  
www.sciencedirect.com

Elsevier Masson France  
 EM|consulte  
www.em-consulte.com



ORIGINAL ARTICLE

# Common peroneal nerve palsy complicating knee dislocation and bicruciate ligaments tears

P. Bonnevalle<sup>a,\*</sup>, F. Dubrana<sup>b</sup>, B. Galaud<sup>c</sup>, S. Lustig<sup>d</sup>,  
O. Barbier<sup>e</sup>, P. Neyret<sup>d</sup>, P. Rosset<sup>f</sup>, D. Saragaglia<sup>g</sup>, the French Society of  
Orthopedic and Traumatologic Surgery (SOFcot)<sup>h</sup>

<sup>a</sup> Locomotor System Institute, Toulouse Teaching Hospital, Purpan Traumatology and Orthopedics Department, place du Dr Baylac, 31052 Toulouse cedex, France

<sup>b</sup> Orthopedics Department, Cavale Blanche Teaching Hospital, 29200 Brest, France

<sup>c</sup> Orthopedics-Traumatology Department, Caen Teaching Hospital, Côte de Nacre, 14033 Caen cedex, France

<sup>d</sup> Albert Trillat Center, North Hospital Group, 8, rue de Margnolles, 69904 Lyon, France

<sup>e</sup> Orthopedic and Traumatologic Surgery Department, Bégin Military Teaching Hospital, 69, avenue de Paris, 94160 Saint Mandé, France

<sup>f</sup> Orthopedic Surgery Department 2, Trousseau Teaching Hospital, 37044 Tours cedex, France

<sup>g</sup> Orthopedic and Sports Traumatology Surgery Department, Grenoble Teaching Hospital, Hôpital Sud, 38130 Échirolles, France

<sup>h</sup> 56, rue Boissonade, 75014 Paris, France

Accepted: 13 December 2009

## KEYWORDS

Common peroneal  
nerve palsy;  
Traumatic knee  
dislocation;  
Bicruciate ligament  
injuries

## Summary

**Introduction:** The occurrence rate of common peroneal nerve (CPN) palsy associated with knee dislocation or bicruciate ligament injury ranges from 10 to 40%. The present study sought first to describe the anatomic lesions encountered and their associated prognoses and second to recommend adequate treatment strategy based on a prospective multicenter observational series of knee ligament trauma cases.

**Material and methods:** Twelve out of 67 knees treated for dislocation or bicruciate lesion presented associated CPN palsy: two females, 10 males; mean age, 32 years. Four sports injuries, three traffic accidents and five other etiologies led to seven complete dislocations and five bicruciate ruptures. Four cases involved associated popliteal artery laceration ischemia; one of the dislocations was open. Paralysis was total in eight cases and partial in four. There were two complete ruptures, three contusions with CPN in continuity stretch lesions and three macroscopically normal aspects.

**Results:** At a minimum 1 year's follow-up, regardless of the initial surgical technique performed, recovery was complete in six cases, partial (in terms of motor function) in one and absent in five. Without specific CPN surgery, spontaneous recovery was partial in one case, complete in

DOI of original article: [10.1016/j.rcot.2009.12.004](https://doi.org/10.1016/j.rcot.2009.12.004).

\* Corresponding author.

E-mail address: [bonnevalle.p@chu-toulouse.fr](mailto:bonnevalle.p@chu-toulouse.fr) (P. Bonnevalle).

two and absent in none. Following simple emergency or secondary neurolysis, remission was total in four cases and absent in one. Three nerve grafts were all associated with non-recovery. *Discussion:* The present results agree with literature findings. Palsy rates varied with trauma circumstances and departmental recruitment. Neurologic impairment was commensurate to ligamentary damages. The anatomic status of the CPN, subjected to violent traction by dislocation, was the most significant prognostic factor for neurologic recovery. In about 25% of dislocations, contusion-elongation over several centimeters was associated with as poor a prognosis as total rupture. CPN neurolysis is recommended when early clinical and EMG recovery fails to progress and/or in case of lateral ligamentary reconstruction. Possible peripheral nerve impairment needs to be included in the overall functional assessment of treatment for severe ligaments injuries and knee dislocation.

*Level of evidence:* Level IV, prospective study.

© 2009 Elsevier Masson SAS. All rights reserved.

In traumatic dislocation of the knee and bicruciate rupture involving severe initial displacement, the peroneal branch of the sciatic nerve is subjected to very severe traction, being immobilized by its passage around the head of the fibula [1–3]. The incidence of associated common peroneal nerve (CPN) palsy ranges from 10 to 40% (Table 1). Prognosis is especially poor as there is often associated rupture of the popliteal artery axis [4–8]. Few studies have specifically focused on the neurological prognosis, whether spontaneous or secondary to surgery, in case of CPN lesion [9–12].

The present study described the anatomic lesions and prognosis for remission of CPN palsy associated with dislocation of the knee and bicruciate rupture. The secondary objective was to assess the medium-term impact of CPN palsy on the overall functional result and to recommend a specific treatment strategy to be integrated in the management of ligament trauma.

## Material and methods

This prospective study recruited 66 patients (67 knees) treated for dislocation of the knee or bicruciate rupture between January 2007 and January 2008 in the 12 member-centers of the 2008 French Society of Orthopedic and Traumatologic Surgery (SOFcot) symposium. The series comprised 51 knee dislocations and 16 bicruciate ruptures; 12 lesions showed associated CPN involvement. The neurologic lesions concerned two female and 10 male patients, with a mean age of 32 years (range, 21 to 53 years). Trauma velocity was judged low in five cases and high in seven. Trauma circumstances were varied: four sport accidents (two soccer, one rugby, one judo), three road accidents (two two-wheel, one four-wheel) and five other (one fall, two farm accidents, one site accident).

Seven of the 12 cases of CPN palsy were associated with complete knee dislocation (one anterior, one anteromedial, one medial, two posteromedial) and five to bicruciate rupture, all associated with on-the-spot reduction of dislocation by the emergency team. One dislocation was open; four CPN palsies were associated with ischemia secondary to popliteal axis rupture. Five patients presented with associated contralateral (two coxofemoral lesions, one bicruciate rupture, one diaphyseal fracture) or ipsilateral peripheral trauma

(one bi-malleolar fracture and one lateral femoral condyle fracture).

CPN palsy was always isolated, with no posterior sciatic involvement. There was total (motor plus sensory) paralysis in eight cases and partial (motor only, with conserved sensitivity) in four. In eight cases, immediate vascular repair or an early secondary ligament approach disclosed the anatomic status of the nerve, with two complete ruptures, three contusions with elongation and three macroscopically normal aspects. No emergency neurologic repair was performed.

The multicenter design did not include any prospective neurologic treatment strategy. Revision criteria were based on the usual clinical and X-ray semiology for knee ligament trauma. Neurologic remission was assessed in terms of the four muscle groups innervated by the CPN: tibialis anterior, extensor digitorum longus, extensor hallucis longus and peroneus longus and brevis. Sensory recovery was assessed at the first dorsal commissure. Patients were also interviewed on general motor function, with mandatory reference to neurologic status (walking and stair climbing, possibility of intense physical activity).

## Results

All 12 CPN palsy patients were followed up for at least 1 year, with examination, except for one patient who had moved out of the area and was contacted by telephone (Table 2). Overall, and independently of surgical attitude, six patients showed total remission, with force equal to the contralateral side and normal sensitivity at the first dorsal commissure. Five patients failed to recover, with total sensorimotor impairment in four cases and partial impairment in one; the remaining patient showed partial remission, with persisting 3/5 paralysis of the anterolateral compartment muscles. Two patient groups could be distinguished in terms of CPN surgery. Four patients underwent no neurological surgery; spontaneous evolution gave partial remission in one case, total remission in two and no remission in one. Five of the other eight patients underwent simple emergency or secondary exploration, according to the spontaneous evolution: four showed total remission and one no remission. The four cases of total remission (from two total and two partial palsies) comprised three normal aspects and one CPN contusion. The failure of recovery

**Table 1** Frequency of common peroneal nerve (CPN) palsy following dislocation of the knee or bicruciate lesion and relation to popliteal artery rupture and joint opening, in recent reports.

	Number of dislocations	CPN palsy (%)	Ischemia	Opening
Honton et al. [18]	11	1 (9)	5	?
Wright et al. [7]	19	9 (47)	5	19
Wascher et al. [19]	47	16 (22)	11	8
Yeh et al. [8]	23	2 (8)	3	0
Richter [21]	89	15 (17)	8	5
Twaddle et al. [20]	63	9 (14)	9	0
Rios et al. [34]	28	6 (23)	2	2
Liow et al. [30]	22	1	1	
Dubrana [10]	91	36 (39)	25	13
Harner et al. [29]	33	4 (12)	Excluded	
Wong et al. [31]	29	1	1	0
Niall et al. [12]	55	14 (25)	1	0
Bonneville et al. [4]	37	23 (62)	14	7
Plancher [33]	50	18 (36)	12	14
SOFCOT symposium	67	12 (18)	8	6

**Table 2** Characteristics of the 12 total (T) or partial (P) CPN palsies following dislocation of the knee (Dis) or bicruciate rupture (Bi).

Patient	F/37	M/53	F/29	M/41	M/29	M/42	M/22	M/21	M/21	M/36	M/25	M/36
Knee lesion	Dis	Bi	Bi	Bi	Dis	Bi	Bi	Dis	Dis	Dis	Dis	Dis
Ischemia	Yes			Yes					Yes		Yes	
Palsy	P	P	T	T	T	T	T	P	T	P	T	T
Lesion aspect				Contusion	Contusion	Rupture	Rupture	Normal	Elongation	Normal	Normal	
Secondary surgery						Graft	Graft		Graft			
Spontaneous remission	No	Total	Partial									Total
Post-op remission				No	Total	No	No	Total	No	Total	Total	

concerned an initially total palsy, with simple CPN contusion found on initial exploration. Three interfascicular grafts were performed: two at month 4 and month 6 respectively, in the two cases of rupture detected in emergency; a third graft was required, at day 25, for an elongation of several centimeters of the CPN trunk. No remission was observed following grafting: one patient had posterior tibial muscle tendon transfer to restore tibio-talar dorsiflexion; positional dorsiflexion splints were prescribed in the other two.

## Discussion

The multicenter series comprised 12 patients presenting with CPN palsy associated with bicruciate lesion or dislocation of the knee sustained during a 1-year period; the numbers are small compared to studies over a longer term and/or focused on this specific post-traumatic neurologic lesion, which include dozens of cases [13–17]. The present study incurs several limitations: the macroscopic aspect of the paralyzed nerve was known in only eight cases, precluding any prognostic analysis of spontaneous remission according to the CPN trauma found peroperatively. The prospective data for the associated lesion were observational, with no recommendations as to treat-

ment. And in assessing the overall clinical result for the knee ligament trauma, the CPN lesion was analyzed separately.

CPN palsy depends on the direction and degree of the initial displacement causing the various ligament ruptures, which in turn depends on trauma velocity: the neurologic lesion, like the popliteal vascular lesion, is part of the regional trauma sustained by the knee. The frequency of CPN palsy varies in the literature according to trauma circumstances and to the surgery team's recruitment (Table 1). There is consensus as to the parallel nature of the neurologic and ligamentary lesions: the more extensive and severe the latter, the more frequent and severe the CPN palsy; the same correlation obtains between cutaneous wound, vascular rupture and palsy [7,8,18–20]. Trauma sustained in an agricultural context or on a two-wheel vehicle is most frequently associated with palsy in case of multiple trauma or ipsi- or contralateral limb lesion. The present 18% incidence of 12 CPN palsies out of 67 dislocations or bicruciate ruptures matches the epidemiological data and corresponds to the varied recruitment of regional hospitals. In the series as a whole, four of the nine popliteal artery axis ruptures were associated with CPN palsy: i.e., 44%, compared to 14% when the vascular axis was conserved. The trauma context should thus guide clinical exploration for possible peroneal sciatic palsy, which might

go undetected in an unconscious patient or in case of multiple fracture where bone lesions obscure the neurological signs.

Isolated CPN palsy shows a characteristic motor and sensory semiology enabling straightforward diagnosis based on objective pathognomic signs, which the patient, in great pain even if conscious, may not be fully aware of. The only factors liable to mislead diagnosis of the anatomic location of the neurological lesion are femoral diaphysis fracture and/or ipsilateral coxofemoral lesion or pelvic ring rupture. Even in direct sciatic trunk trauma, CPN involvement may appear clinically isolated. Neurologic symptoms in the territory of the tibial nerve suggest an underlying knee lesion. In ischemia due to popliteal artery rupture, after a few hours' evolution the clinical symptoms include a neurological component leading to total sensorimotor motor and sensory paralysis, precluding detection of any CPN palsy "behind" the vascular symptomatology [4,8,11]. Likewise, compartment syndrome requiring aponeurotomy or muscular sequelae of ischemia also hinder neurological assessment. Only early clinical examination within the first hours can solve this diagnostic issue. In the present series, only one patient presented with dislocation of the knee associated with a displaced lateral condyle fracture: during open fixation, the CPN was found to be continuous and no anatomic factor underlying the paralysis could be determined. In the four cases of ischemia due to popliteal artery rupture, CPN palsy was isolated, without impact for the posterior sciatic territory, illustrating the independence between the neurologic and vascular lesions.

The anatomic status of the CPN, subjected to violent traction during the dislocation, is the prime prognostic factor for spontaneous neurological remission. This is not always specified in the literature, often because peroperative CPN exploration and imaging were lacking. Some authors perform systematic early exploration [11,12], others only during lateral ligament repair [21]. The anatomic aspect of the traumatized CPN is generally known when palsy occurs secondary to open dislocation and/or vascular rupture, which require surgical exploration. Nerve rupture is then found in about a quarter of cases: it is never regular but always associated with several centimeters of laceration (Table 3). In complete paralysis, the other anatomic aspect found is contusion and/or elongation of the nerve along several centimeters. With such an aspect of non-ruptured nerve and associated palsy, spontaneous remission is hard to predict. Niall et al. [12] gave a precise macroscopic description of the paralyzed CPN in 14 dislocations of the knee and drew up a prognosis chart in terms of the extent of contusion. Three out of 10 non-ruptured CPNs showed less than 7 cm contusion and seven between 7 and 12 cm. In two cases in the former group, total spontaneous remission was obtained in only 3 months; in two cases in the latter group, the CPN remained paralyzed, two showed partial remission and four recovered virtually normal function in 12–18 months. Thus, the length of the trauma lesion in a non-ruptured CPN was predictive of recovery; and extensive CPN contusion on top of total anatomic rupture was predictive of failure of spontaneous remission, as also highlighted by Piton et al. [16] in a retrospective study of more than 150 CPN lesions: 22 CPN palsies were found in a series of knee dislocations in which the CPN was explored only in case of spon-

taneous remission, with nine non-ruptured nerves that were simply released and 13 ruptures, managed by graft. Six of the nine neurolyses gave excellent results, although the exact anatomic status was not specified. Lesion length is also a prognostic factor for regrowth following interfascicular graft [13–17]. With only eight anatomic lesions known out of 12 paralyzed nerves, the present series cannot provide quantitative data, but is in line with literature findings. The neurologic lesion is situated at the passage around the fibular head; but the proximity of the bifurcation may also account for the tearing of the terminal branches where they penetrate the muscle [12]. In emergency, the likelihood of irreversible CPN lesion is not clearly known. NMR spectroscopy sheds light on capsule-ligamentary anatomic status, but not on the neurologic lesion [22–24]. Systematic exploration to assess CPN anatomy in case of failure of EMG and/or clinical recovery at 3 months may be rendered superfluous by the simplicity and reliability of sonography, which can easily be repeatedly performed during surveillance and, in expert hands, provides reliable assessment of the neurologic lesion [25,26].

Functional prognosis for the limb following dislocation or bicruciate rupture depends not only on ligament healing but also on neurologic remission when there is total CPN palsy, as seen in a steppage gait and tibio-talar joint instability. Neurologic sequelae inevitably impact overall limb function and rapid walking and running in particular. In recent series of surgery for dislocation of the knee, this functional impact has seldom been highlighted. Certain authors excluded associated CPN palsy from their ligament repair series [27,28]. For others, rapid spontaneous remission eliminated impact on ligament repair results [8,29–31]. Despite considerable rates of rupture and non-remission, several authors did not mention the impact of neurologic sequelae on their final results [7,21,32–34].

There is no consensus attitude towards palsy, which is seldom mentioned in reports on ligament surgery [8,26,28,35,30,31] or on overall management of such trauma cases [6,11,29,36–39]. Rosset et al. [40] distinguish several situations: in case of subtotal palsy, CPN release is recommended if early clinical and EMG recovery fails to progress and/or in all cases of lateral ligament repair. In total initial palsy, exploration and release are systematic in case of lateral ligament surgery; when rupture is discovered, the extremities are to be located to facilitate secondary interfascicular grafting. In knee dislocation with associated CPN palsy, Goitz and Tomaino [41] recommend early surgery, in agreement with Niall et al. [12]; they reported their experience in treating CPN palsy of various origins, recommending convergent attitudes in the light of the analysis of the results reported in the literature [13,14,42,16,17] and recommend early intervention in the absence of signs of clinical and EMG improvement. CPN surgery is to be guided by the macroscopic aspect and should at least comprise release from fibrotic scar tissue. In case of total rupture or a contusion segment with fascicular interruption requiring resection into healthy tissue, experience shows that long grafts fail to achieve recovery: according to Bleton et al. [13], 20 cm is the threshold beyond which functional axon regrowth is no longer obtained; Kim et al. [15] set the threshold at 6 cm and Piton et al. [15] at 15 cm. The poor prognosis for spontaneous remission of extensive anatomic lesions leads certain

**Table 3** Review of the main literature series describing the macroscopic aspect of paralyzed common peroneal nerve in dislocation of the knee.

	Palsies/dislocations	CPN explored	Total rupture
Wright et al. [7]	9/19		
Wascher et al. [19]	16/47	7	2
Richter et al. [21]	15/89	15	12
Rosset et al. [40]	36/91	8	3
Harner et al. [29]	4/33	3	1
Niall et al. [12]	14/55	14	4
Bonneville et al. [4]	23/37	11	1
		57	23 = 40%

authors to recommend associating nerve surgery and tendon transfer in a single operative step [14].

## Conclusion

CPN palsy is frequent in dislocation of the knee and bicruciate lesion, as a result of the trauma and displacement velocity involved. The nerve is ruptured or the lesion is irreversible in more than a third of cases, with no hope of spontaneous remission. The neurologic sequelae seriously impact the overall functional result. As with the vascular lesions, the displacement needs to be rapidly reduced to restore the anatomic trajectory of the CPN. Early surgery is recommended, comprising at least exploration and CPN release along the lateral fibular trajectory. Total rupture and contusion of more than a few centimeters are of poor prognosis for grafting. The patient should be quickly and clearly informed of this and palliative treatment proposed. Any neurologic involvement would be usefully included in assessing the overall functional results of treatment for severe rupture and dislocation of the knee.

## Conflict of interest

None.

## References

- [1] Reebye O. Anatomical and clinical study of the common fibular nerve. *Surg Radiol Anat* 2004;26:365–70.
- [2] Ryan W, Mahony H, Delaney M, O'Brien M, Murray P. Relationship of the common peroneal nerve and its branches the head and neck of the fibula. *Clin Anat* 2003;16:501–5.
- [3] Tomaino M, Day C, Pagageorgiou C, Harner C, Fu FH. Peroneal nerve palsy following knee dislocation: patho-anatomy and implications for treatment. *Knee Surg Sports Traumatol Arthrosc* 2000;8:163–5.
- [4] Bonneville P, Chaufour X, Lousteau O, Mansat P, Pidhorz L, Mansat M. Luxation traumatique du genou associée à une interruption de l'artère poplitée. Étude rétrospective critique d'une série de 14 cas. *Rev Chir Orthop* 2006;92:768–77.
- [5] Robertson A, Nutton RW, Keating JF. Dislocation of the knee. *J Bone Joint Surg Br* 2006;88:706–11.
- [6] Seroyer ST, Musahl V, Harner CD. Management of the acute knee dislocation: the Pittsburgh experience. *Injury* 2008;39:710–8.
- [7] Wright DG, Covery DC, Born CT, Sadasivan KK. Open dislocation of the knee. *J Orthop Trauma* 1995;9:135–40.
- [8] Yeh WL, Tu YK, Su JY, Hsu RW. Knee dislocation: treatment of high-velocity knee dislocation. *J Trauma* 1999;46:693–701.
- [9] Bonneville N, Delannis Y, Beaulieu JY, Martinel V, Mansat P, Bonneville P. Paralysie du nerf fibulaire commun dans les luxations traumatiques du genou. *Rev Chir Orthop* 2006;92(Suppl. VI), 3S131.
- [10] Dubrana F. Lésions nerveuses (table ronde de la SOO). *Ann Orthop Ouest* 2003;35:324–8.
- [11] Johnson ME, Foster L, de Lee JC. Neurologic and vascular injuries associated with knee ligament injuries. *Am J Sports Med* 2008;36:2448–62.
- [12] Niall DM, Nutton RW, Keating JF. Palsy of the common peroneal nerve after traumatic dislocation of the knee. *J Bone Joint Surg Br* 2005;87:664–7.
- [13] Bleton R, Alnot JY, Oberlin C. Les lésions traumatiques du tronc du nerf sciatique et ses branches terminales. *Rev Chir Orthop* 1993;79:205–17.
- [14] Garozzo D, Ferraresi S, Buffatti P. Surgical treatment of common peroneal nerve injuries: indications and results. A series of 62 cases. *J Neurosurg Sci* 2004;48:105–12.
- [15] Kim DH, Murovic JA, Tiel RL, Kline DG. Management and outcomes in 318 operative common peroneal nerve lesions at the Louisiana State University Health Sciences Center. *Neurosurgery* 2004;54:1421–8.
- [16] Piton C, Fabre T, Lasseur E, Andre D, Geneste M, Durandea A. Les lésions du nerf fibulaire commun : approche diagnostique et thérapeutique. *Rev Chir Orthop* 1997;83:515–21.
- [17] Sedel L, Nizard NS. Nerve grafting for traction injuries of the common peroneal nerve. *J Bone Joint Surg Br* 1993;75:772–4.
- [18] Honton JL, Le Rebeller A, Legroux P, Ragni R, Tramond P. Luxations traumatiques du genou. Traitement chirurgical précoce : à propos de 12 cas. *Rev Chir Orthop* 1978;64:213–9.
- [19] Wascher DC, Dvirnak PC, De Coster TA. Knee dislocation: initial assessment and implications for treatment. *J Orthop Trauma* 1997;11:525–9.
- [20] Twaddle BC, Bidwell TA, Chapman JR. Knee dislocations: where are the lesions? A prospective evaluation of surgical findings in 63 cases. *J Orthop Trauma* 2003;17:198–202.
- [21] Richter M, Bosch U, Wippermann B, Hofmann A, Krettek C. Comparison of surgical repair or reconstruction of the cruciate ligaments versus nonsurgical treatment in patients with traumatic knee dislocations. *Am J Sports Med* 2002;30:718–27.
- [22] Potter HG, Weinstein M, Allen AA, Wickiewicz TL, Helfet DL. Magnetic resonance imaging of the multiple-ligament injured knee. *J Orthop Trauma* 2002;16:330–9.
- [23] Twaddle BC, Hunter JC, Chapman JR, Simonian PT, Escobedo EM. MRI in acute knee dislocation. A prospective study of clinical, MRI, and surgical findings. *J Bone Joint Surg Br* 1996;78:573–9.
- [24] Yu JS, Goodwin D, Salonen D, Pathria MN, Resnick D, Dardani M, et al. Complete dislocation of the knee; spectrum of asso-



- ciated soft – tissue injuries depicted by MR imaging. *AJR Am J Roentgenol* 1995;164:135–9.
- [25] Brasseur JL, Sans N. La place de l'échographie dans les syndromes compressifs du membre supérieur. *Chir Main* 2004;23:S27–34.
- [26] Gruber H, Peer S, Meirer R, Bodner G. Peroneal nerve palsy associated with knee luxation: evaluation by sonography - initial experience. *AJR Am J Roentgenol* 2005;185:1118–25.
- [27] Ibrahim SA, Ahmad FH, Salah M, Al Misfer AR, Ghaffer SA, Khirat S. Surgical management of traumatic knee dislocation. *Arthroscopy* 2008;24:178–87.
- [28] Ohkoshi Y, Nagasaki S, Shibata N, Yamamoto K, Hasshimoto T, Yamane S. Two stage reconstruction with auto grafts for knee dislocations. *Clin Orthop* 2002;398:169–75.
- [29] Harner CD, Waltrip R, Bennett GH, Francis KA, Cole B, Irrgang JJ. Surgical management of knee dislocation. *J Bone Joint Surg Am* 2004;86:262–73.
- [30] Liow RY, Macnicolas MJ, Keating JF, Nutton RW. Ligament repair and reconstruction in traumatic dislocation of the knee. *J Bone Joint Surg Br* 2003;85:845–51.
- [31] Wong CH, Tan JL, Chang HC, Khin LW, Low CO. Knee dislocations – a retrospective study comparing operative versus closed immobilisation treatment outcomes. *Knee Surg Sports Traumatol Arthrosc* 2004;12:540–4.
- [32] Mariani PP, Santoriello P, Iannone S, Condello V, Adriani. Comparison of surgical treatments for knee dislocation. *Am J Knee Surg* 1999;12:214–21.
- [33] Plancher, Siliski J. Long-term functional results and complications in patients with knee dislocations. *J Knee Surg* 2008;21:261–8.
- [34] Rios A, Villa A, Fahandezh H, de Jose C, Vaquero J. Results after treatment of traumatic knee dislocations: a report of 26 cases. *J Trauma* 2003;55:489–95.
- [35] King JJ, Cerynik DL, Blair JA, Harding SP, Tom JA. Surgical outcomes after traumatic open knee dislocation. *Knee Surg Sports Traumatol Arthrosc* 2009;17:1037–42.
- [36] Dedmond BT, Almekinders LC. Operative versus non-operative treatment of knee dislocation: a meta-analysis. *Am J Knee Surg* 2001;14:33–8.
- [37] Giannoudis CS, Freedman KB. Knee dislocations: management of multiligament-injured knee. *Am J Orthop* 2004;33:553–9.
- [38] Good L, Johnson RJ. The dislocated knee. *J Am Acad Orthop Surg* 1995;3:284–5.
- [39] Rihn JA, Groff YJ, Harner CD, Cha PS. The acutely dislocated knee: evaluation and management. *J Am Acad Orthop Surg* 2004;12:334–46.
- [40] Rosset PH, Dubrana F, Lermusiaux, Letenneur J, Mabit C. Luxation traumatique du genou de l'adulte. Table ronde de la SOO. *Ann Orthop Ouest* 2003;35:303–36.
- [41] Goitz RJ, Tomaino MM. Management of peroneal nerve injuries associated with knee dislocations. *Am J Orthop* 2003;32:14–6.
- [42] Ferraresi S, Garozzo D, Buffati P. Common peroneal nerve injuries; results with one-stage nerve repair and tendon transfer. *Neurosurg Rev* 2003;26:175–9.