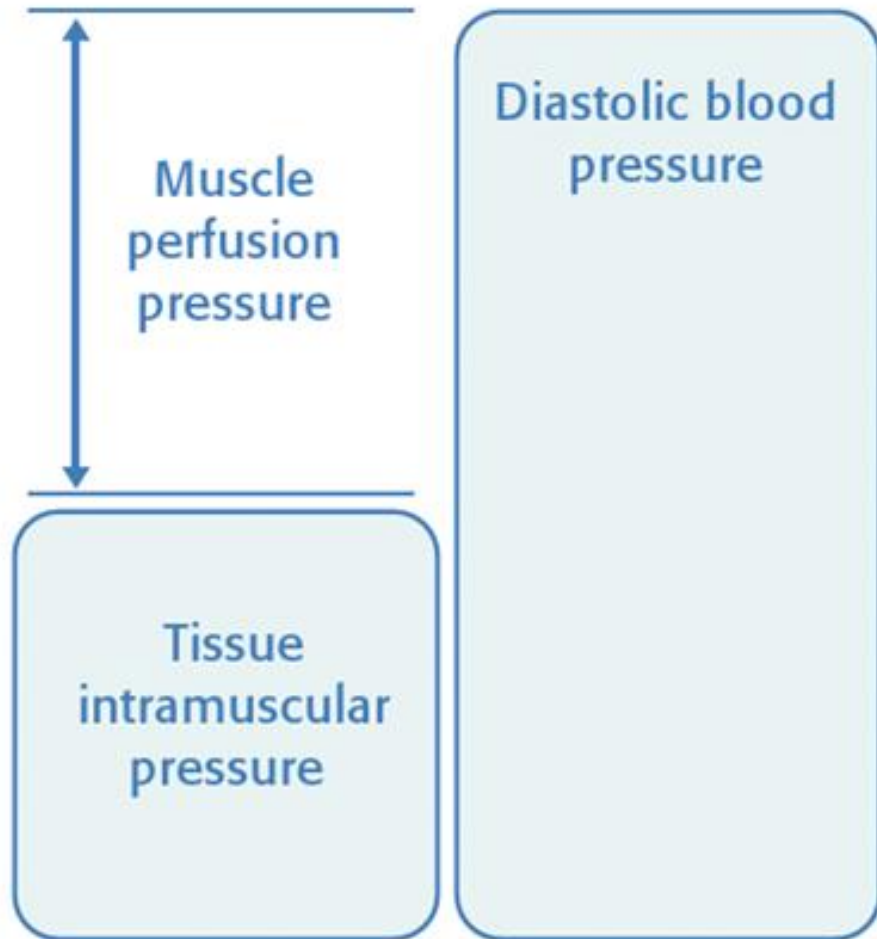
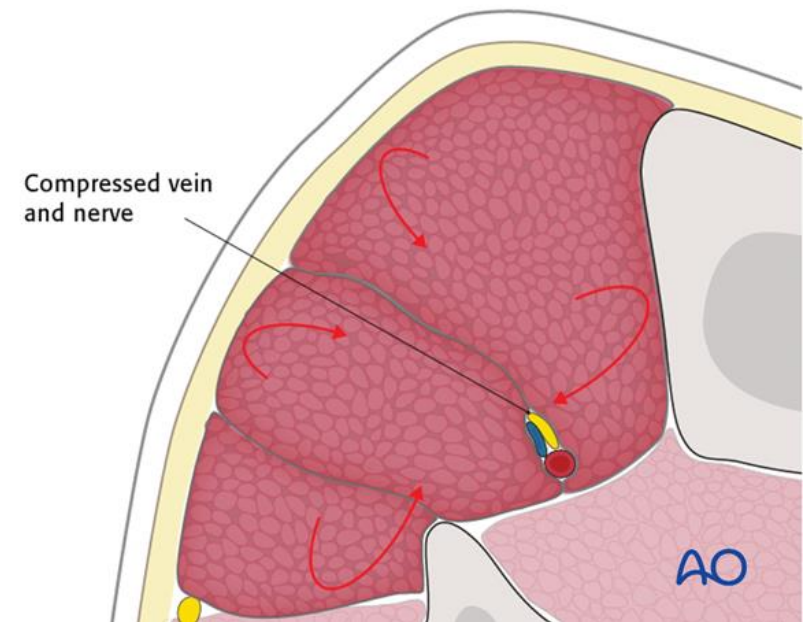


Compartment syndrome
is
a true surgical emergency



if diastolic arterial pressure is less than 30 mm Hg above tissue pressure, compartmental capillary blood flow is significantly obstructed and severe hypoxia occurs in muscle and nerve tissue.

AO



コンパートメント症候群の症状は？



Diagnosis

Do not wait for all 5 P's to appear,
as these findings are considered
to be **late findings.**

~~5 P's~~

Paralysis

Pallor

Paresthesia

Pulselessness

Pain /
Swelling



nabilebrahe@gmail.com



Diagnosis

**Do not wait for all 5 P's to appear,
as these findings are considered
to be late findings.**



~~5 P'S~~

Paralysis

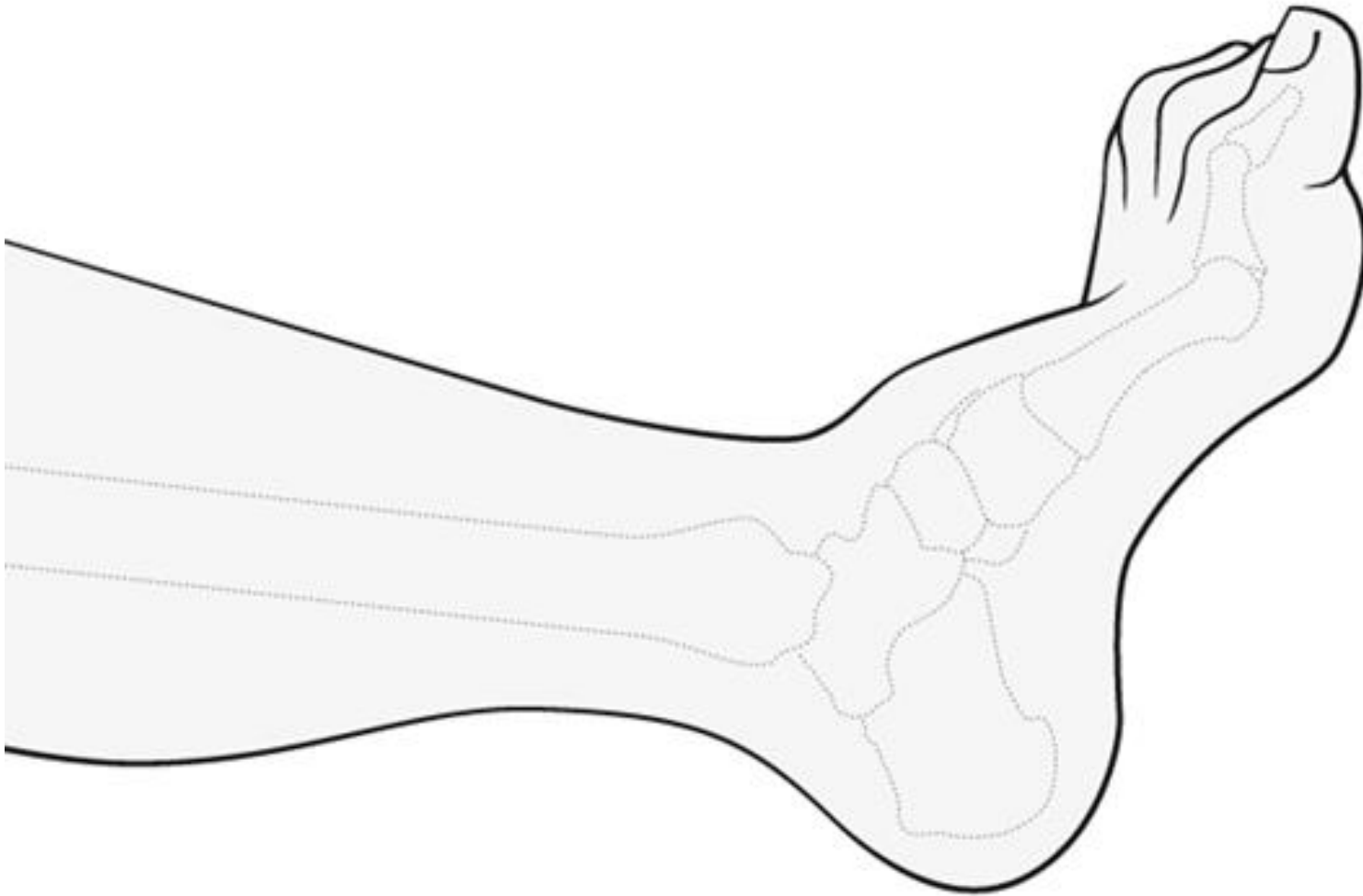
Pallor

Paresthesia

Pulselessness

Pain /
Swelling





Volkmann contracture of the foot as a result of a neglected lower leg compartment syndrome: note the pes cavus and clawed toes

AO

Case

56歳男性
階段転落



1st stage

創外固定 減張切開 (前医にて)



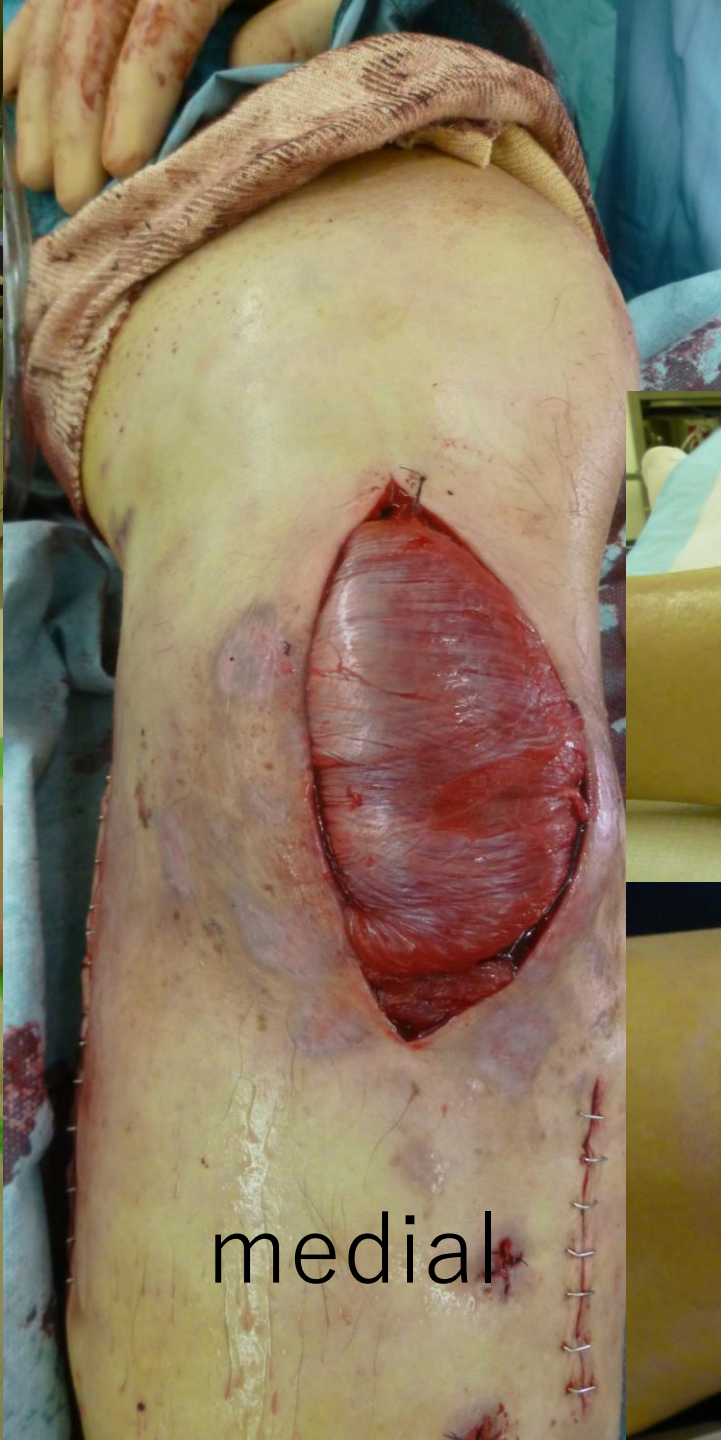
Day3

当センターへ転院

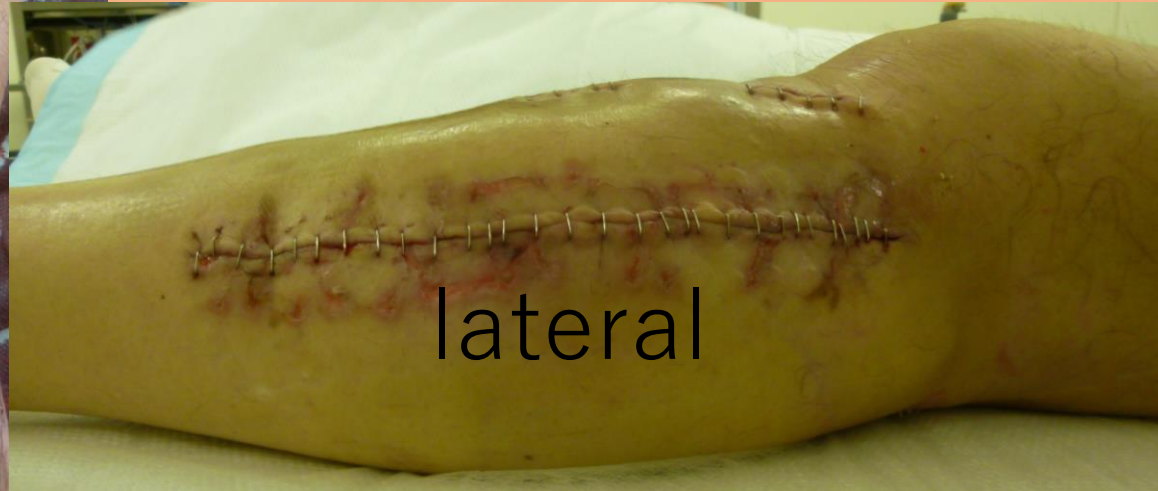




Day10



Day **11**
骨接合 + 軟部組織再建

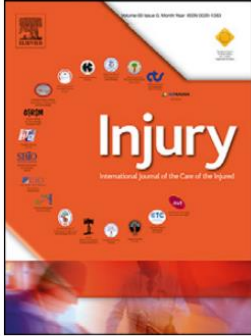




Contents lists available at [ScienceDirect](#)

Injury

journal homepage: www.elsevier.com/locate/injury



Big data insights into predictors of acute compartment syndrome

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A R T I C L E I N F O

Article history:

Accepted 16 February 2022

Keywords:

Acute compartment syndrome

Big data

Complications

Trauma

Introduction: コンパートメント症候群(ACS)

筋区画内圧の上昇により組織が障害される
迅速な診断・治療がなされなければ切断！

計測器具は誤差が大きく信用できない

(しかし)診断は筋区画内圧測定がゴールドスタンダード
(他にいい方法がない)

筋区画内圧20-30mmHgで症状出現

筋区画内圧 **30-45** mmHg

拡張気圧 - 筋区画内圧 = **30** mmHg 以下



Fasciotomy
減張切開

Pain ↑ Passive stretching test(+) → **Fasciotomy**
(Expert opinion)



IF NOT NOW

then when

いつACSを疑う？いつ測定する？

筋区画内圧測定の明確な基準はない

増強する痛み、知覚障害などから減張切開の必要性を考えざる得ない

見逃しや過剰な減張切開の原因になっている

ACSを防ぐために臨床所見から予防的に減張切開を行っていることが多い

Level1TraumaCenterでは容易に手術室へ行けるためACSの報告が少ないのかもしれない

経済的損失は世界で10億円と言われているにもかかわらず、治療や予後を予測する診断用のパラメータやリスクファクターについての文献がでていない

Methods:

Big Data(Trauma Quality Programs)を使用したコホート研究

20万 例脛骨骨折 / 400万 例外傷症例

検討項目は潜在的なリスク因子、筋壊死の診断、予後など

Table 1

Prevalence rate of ACS across different years of TQP data.

	TQP 2015		TQP 2016		TQP 2017		TQP 2018		Total TQP	
Total Trauma Cases	912,816		963,134		1004,440		1043,737		3924,127	
Tibial Fx	46,262	5.07%	49,137	5.10%	53,208	5.30%	54,893	5.26%	203,500	5.19%
Fasciotomies (% of Tibial Fx)	1835	3.97%	2279	4.64%	2463	4.63%	2171	3.95%	8748	4.30%
Necrosis (% of Fasciotomies)	230	12.53%	332	14.57%	436	17.70%	474	21.83%	1472	16.83%
Amputations	107	5.83%	110	4.82%	127	5.16%	132	6.08%	476	5.44%

減張切開

4%

過去の報告では10-12%

切断

5%

Table 2

Fasciotomy by trauma center level.

		Trauma Center levels		
		I	II	III
Fasciotomy	No	78,884	39,634	7225
	Yes	4070	1766	143
	Percentage	5.16%	4.46%	1.98%

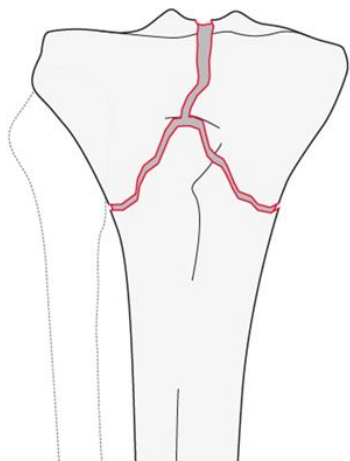
Level 1 > 2 > 3

Table 3

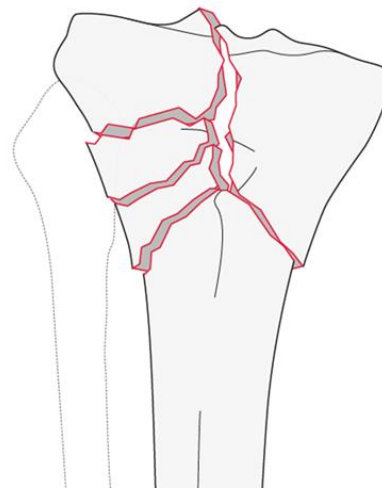
Distribution of fracture OTA group and subgroup within fasciotomy group.

OTA group	OTA subgroup			Total
	a	b	c	
41	167	255	3287	3709
42	440	130	1750	2320
43	241	296	96	633
Total	848	681	5133	6662

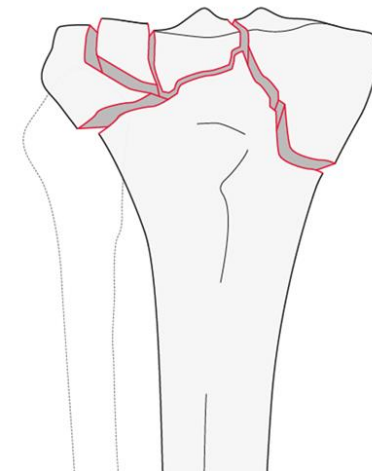
OTA 41C 50%以上



AO



AO



AO

Table 4

Odds of fasciotomy adjusted on clinical indicators.

Factor	Levels	Number of Patients (with ACS)	O.R	Confidence interval of the O.R (95%)		P value
Age (Years)			0.99	0.988	0.991	<0.0001
Sex	Male	129,724 (6868)	1.709	1.588	1.839	<0.0001
	Female	73,758 (1878)				
Open Fracture	Yes	50,856 (3736)	2.432	2.281	2.594	<0.0001
	No	146,896 (4863)				
OTA group	Proximal	71,510 (4260)	2.722	2.466	3.004	<0.0001
	Midshaft	56,106 (2802)	1.681	1.523	1.857	<0.0001
	Distal	60,530 (1141)				
OTA subgroup	C	84,128 (5133)	1.547	1.432	1.67	<0.0001
	B	21,516 (681)	1.178	1.048	1.323	0.0058
	A	37,981 (848)				
Crush injury	Yes	1154 (135)	1.839	1.525	2.216	<0.0001
	No	102,313 (4499)				
Penetrating Injury	Yes	3872 (479)	1.373	1.115	1.69	0.0028
	No	190,880 (8269)				

O.R. – Odds Ratio.

男5.3% 女2.3%

Proximal Distalの2.7倍

Midshaft Distalの2倍

Open Fracture 2倍

Table 5

Effect of drug abuse on the odds of fasciotomy adjusted on clinical and demographic indicators.

Factor	Levels	Number of Patients (with ACS)	O.R	Confidence interval of the O.R (95%)		P value
Age (Years)			0.99	0.988	0.992	<0.0001
Body Mass Index (kg/m ²)			1.019	1.013	1.025	<0.0001
Sex	Male	68,914 (3632)	1.692	1.572	1.821	<0.0001
	Female	39,181 (1001)				
Stimulant drugs	Yes	7355 (390)	0.976	0.868	1.098	0.6855
	No	100,746 (4244)				
Depressant drugs	Yes	12,135 (703)	1.125	1.026	1.233	0.0118
	No	95,966 (3931)				
Cirrhosis	Yes	776 (39)	1.289	0.928	1.789	0.1296
	No	107,325 (4595)				
Hypertension	Yes	24,266 (739)	0.867	0.792	0.95	0.0022
	No	83,835 (3895)				
Smoking	Yes	27,367 (1431)	1.157	1.083	1.236	<0.0001
	No	80,734 (3203)				
Open Fracture	Yes	28,035 (2095)	2.457	2.305	2.618	<0.0001
	No	80,066 (2539)				
OTA group	Proximal	39,462 (2313)	2.758	2.499	3.044	<0.0001
	Midshaft	31,051 (1561)	1.719	1.557	1.898	<0.0001
	Distal	33,772 (610)				
OTA subgroup	C	47,884 (2903)	1.507	1.396	1.628	<0.0001
	B	12,593 (393)	1.157	1.03	1.3	0.0138
	A	21,692 (471)				

開放骨折、男、BMI、肝硬變、喫煙、脛骨近位骨折→筋壞死

Discussion

Big dataから減張切開を検出することはACSもしくはACSが切迫していた早期手術群をみている
減張切開がTrauma centerのレベル順に多いことは過去の報告と一致

脛骨骨折の**5%**に減張切開

PACS study 12.6%という前向き研究があるが骨折型を脛骨近位と骨幹部を対象にしている点が異なる
他に4.7%という報告もある

脛骨**近位**骨折でハイリスク 骨折が**複雑**なほどハイリスク

→**開放骨折ではACSのリスク、筋壊死のリスクが高くなる！**

肝硬変患者や喫煙者ではハイリスク 浮腫や血管の問題があるのかもしれない

高血圧患者では12%も減張切開となる患者が少ない 血圧により組織還流が維持されるのかもしれない

→**患者管理のヒントになるかもしれない 利尿剤の使用や血圧の維持など**



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Chinese Journal of Traumatology

journal homepage: <http://www.elsevier.com/locate/CJTEE>



Original Article

Intravenous Mannitol reduces intracompartmental pressure following tibia fractures: A randomized controlled trial

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This preliminary study appears to show that Mannitol is **useful** in the management of the increased compartment pressure.

Conclusion

ACSは軟部組織損傷
高血圧、肝硬変患者の結果
→別の要素も関与しているのだろう