



Les chaussettes de compression pour homme sont-elles bien adaptées à la population masculine française ? Quel impact sur la pression délivrée ?

Are compression stockings for men well adapted to the size fitting with the male French population? What is the impact on effective values of pressures expected?

PKS98NS9el (, ^BQJCNi, p>B rñ, qS<<N4 * ,
eB<PS:JNGIGB\ KJCNEI *, b9PKNCNI *

Résumé

Efficiency and acceptability of medical compression stockings (MCS) require a good fit between stocking size and limb dimensions. The risk of a poor fitting increases when the leg's shape differs from the mean shape.

By means of a numerical model, the pressure fields exerted by a French class 2 below-knee MCS on a men's leg with unusual shape (prominent calf) were computed, using three different sizes from the Innothera size chart:

- La taille 2 _ @B9J:9CN@N<<JBCB>FSGNCPKN8JGGN Nat ankle level but too high at the calf: 24 mmHg.
- La taille 4 _ 9CN@N<<JBCB>FSGNFBGGNSJ<?9S<J C9GGNCPKN8JGGN<GN<ON96PS<GSPBF@N<<JBC CN<:@SO™N<<J8FSJ<@BLN<<J8
- La taille 2+ _ P™™@B9PN5@NFB>@KBGBLJNSGJ<N this particular shape of leg, the pressures reached the values expected with a French class 2 MCS: 18 mmHg at the ankle, 11 mmHg at the calf.

We compared the body measurements of the male population with the size charts of below-knee stockings for men available on the French market.

The coverage rate for this population varies, among models, from 41 to 98.3% in 18-70 years old population, and from 55.9 to 94.1% in older than 70 years men.

Summary

Efficiency and acceptability of medical compression stockings (MCS) require a good fit between stocking size and limb dimensions. The risk of a poor fitting increases when the leg's shape differs from the mean shape.

By means of a numerical model, the pressure fields exerted by a French class 2 below-knee MCS on a men's leg with unusual shape (prominent calf) were computed, using three different sizes from the Innothera size chart:

- The pressure generated by the size 2 MCS was normal at ankle level but too high at the calf: 24 mmHg.
- With the size 4 MCS the pressure was normal at the calf but near zero at the ankle; in both cases pressure profile was progressive, not degressive.
- When using the size 2 plus MCS, which is intended for this particular shape of leg, the pressures reached the values expected with a French class 2 MCS: 18 mmHg at the ankle, 11 mmHg at the calf.

We compared the body measurements of the male population with the size charts of below-knee stockings for men available on the French market.

The coverage rate for this population varies, among models, from 41 to 98.3% in 18-70 years old population, and from 55.9 to 94.1% in older than 70 years men.

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fN< :S96 @BPKN<ON(AA- O N N>SJC<FBO'GN<
PBFFN fNLLN>pGS<@PfNLLN>J>MJCN fNLLN>
VNC< ,<BC: BQ:NC9<S9 @>J629CNF9G:J@GJPSQ8C
CBFON ON SJGONGN9>JGGNI
```

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fN< PKS9<<N::N<KBFFN OJ<@BCJQGN>GNFS>PK™  
MSCµSJ<N>FN::NCBPCO2™?9J<PB>NP:NFNC:GS  
L$CONF$IB>J:TONGS@B@9GS:FSC9GJCFSJ<ON<  
QJ<@S>NPU<:NNC:N GO>JPSON<@BO9J:<I
```

Mots-clés : *compression veineuse, taille des bas.*

- The coverage rate near 100% reached by some models, as Legger Classic®, Legger Surfline®, and Legger Zen®, is obtained by means of an increased number of sizes in their chart.

We conclude that, with regard to the range of sizes available, the below-knee stockings for men available on the French market meet the needs of the vast majority of the French male population, though discrepancies exist between manufacturers and between models.

Keywords: PBF@N<JBCBPHJCL<JN ^::JCLI

Introduction

fs PBF@N<JBON:NGN>JCPJ@SSNFNCBCJC8<JM
ONG2JC<9MMJ8SCPN<MCMSCPNNG9NGJ<19>B9:
GN<QS<ON PBF@N<JBCF™OJPSGNpe3, :>'<
FSIB>J:SFNC:ON™>PSGN9FN<9N,09MS,ONBC
PBÂN:ON<SOJ<@BCJQJCN<NMC8J<SLNSQON@B9>
9CN@N:JFUCB>J:ON@S:JNC:<I

L'efficacité et l'observance du traitement requièrent une bonne adaptation des BCM aux mensurations du patient.

pN::NTM8JONCPGJCJ?9N @ , :N @TMPJ<TMGS>GS
FBOTMGJ<S:J9TM>J?9N9J FBC:N 92C OTMPSGSLN
O29CNSJGON QS<S 9> GNPKSF@ON<@N<<JBC<
S@@GJ?9NTM5<NS9S@B8FS:J8FNC:GNF, FN NMMN:
?929COTMPSGSL29CNGS<ONPBF@N<<JBC\$

D'où l'importance d'une bonne adéquation entre les mensurations de la population à équiper et la grille de tailles des BCM disponibles.

oSC<9CN@>™P™ONC9N1\$,CB9<SBC<FBC:>™9N
@B9S@B@9GSMJFCJMSμSJ<N<JFBO'GNON
QS<ONPGS<N<@G9NC09<N@>™<NC<SC:- O 9
FS>PK™3<9NC:9CNPB9N>N NC SJG9N:J<MSJ<SC:N
SGGS9N!! - ®)) - ,<NGBGNFBO'GNQS<{P9J<B9
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fS ?9N<:JBONG2SOS@:SNBSJG@B<NB9: S9:SC:
@B9>GNPKS9<<N::N@B9>KBFFN, ?9J >N@>TM<NC:NC:
(y,)* - O 9 F S P K T T : \$ I

f2BQINP:OMP>S8JN<ON@>™<NCP9>G@B@9GS:JBC
FS<P9GJOCuSJ<N

2JF@SPON GS:SJGGN9 qpe <9> GN<@N<<JBC<
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 ?9JOJMM9N9NGG9FBGGM9EJJC

04 <S96ONPB981>N NC SJG GNP::N@B@9GS:05<
 GNPKS9<<N::GNPGS<<N@B9>KBFFN, OJ<@BCJQGN4
 <9>GITS>PKTMS CuSJ<

Matériel et méthodes

Morphologie de la jambe dans la population masculine française

0N96PSF@SLC0NFNC<9S:JBC8C:TM:TM TM SGJ<@N8
G2iC<J:0NSCμSJ09W6:JGN: ONG2jSQJGGNFNFQ3 _
9CNNC;AA%PKN4) y%KBFFN<`L TM<ON(y ® "A SC<,
9CNNC;AA) PKN4)KBFFN<`L TM<@G93N'A SC<1*\$I
rMJON>S8JGG49>9C TM PKSC:JG99CBJ>N@>TM<NC:S:JM
ONG@B@9GSMBCμSJ<9C@BC08MB8C TM NM MNP:9 TM N
NC:N 08N><N<PS:TM LB>JON <9IN:< .B@`9JBCON
>0N<<NFNCQN<:JC@B>>JLQNJJSJ32 TM PKSC:JGGBCCSLN3I
pNPJ6@GJ>99N GN4IMMNPBVC<JO TM *in time* @B9>
G2SCSG3MMCG TM LNFNC.ONPN969>NP>9:NFNCON
Q TM @S>

fN<FJSLN<FB>@KBGBLJ?BQ<TM:TM>SP?9J<B9FB5NC
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<9>MSPB>@BSGNI

© >J> ONPN<OBCC™BCN S@@GJPS<B™PJMJ?9N
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J<<9NON<PSC™, ONCBFQ™96>SJ:NFN<S:J<:J?9N<
BC:™·™™SGJ<™<

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™™?9S:JBC<N>™™N<JBE9G:J[S>JSQGN6_<S:9>N,
@BJO'LN3]

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.FB5NCCN,@PNC:JGN*PS>5@N<PI3N:PB9@GSLN<
NC:N FNC<9S:JBC<|

pSGP50NFB>@KB:5@101>@™<NC:00<L>B9@N<
KBFL'CN<NCN>FN<NFB>@KBGBLJNl

aB9>CB:N T9ONONPB98N>9N NC SJGGN,9GMBN96ON
PNFNC<9S:JBCBC:TM:TMNC9N<
□ @>JF'N @ S FN8JGGN<9>TMOSC<9C @GSC
KB>BC:SG9CJ8S9B" NGON:GSG9MJC
□ @>JF'N @ F BGGFN<9>TMOSC9C@GSG>BC:SG,
S9CJ8S9B" JON<:GM@GSGN

Calcul des pressions appliquées à la peau

fN Q9: N<: ON PBCCSN>N KSF@ ON< @N<<JBC<
S@@GJ?9@N<@S9@S9C qpe NC MCP:JBON<BC
:SJGGSLONGFB>@KBGBQ9FBGGN:I

fS @N<<JBC@>GJ?9@N<@S9,a@ N: PSGP9G9N
FB5N @ GBJONS@GSPN@ DU^, B" \N<:GSNC<JBC
O9:N6:JGN;^ @ SBCONPB9>Q9>9 FNFQNI

fN< 8SGN9>ON^ N: \ NC PKS?9N@BJC<BC: J<<9N<
>N@NPNJBNC: O29CMJPKJN>FB>@KBGBLJN O29C
MJPKNpe p OMP>Jp{S@>'<I

Fichier « morphologie »

fN< SBC<ONPB9>Q9>BC: TM:TMPSGP9G@S>SJ:NFNC:
JCMB>FS:J?9@>J>ON<PBB9BCC TMON%)*A(@BJC:<
ON<9>MSFONGS9FQN,BQ:NC9N@S>PSCCNB@:J?9N
*ol

aG9>@>TM PJ<TM FNGS9FQNPBJ<J@B9>PNPSGP9G TM
8J>9NGGNFNC TM PB9>ONANP:JBCK>BC:SGN<@SP TMN<
GN<CN<ON<S9:N< ON(PF 0 <9>PKS?9N@ TM>JFN<
ISFQJN>SJC<J TM MJCJ @BJC:<M?9JOJ<:SBC: TM:TM
PKBJ<JN:GNRBB9BCC TMONPN<@BJCBC:TM:TM
@B9PSGP9G N>SBC<ONPB9>Q9>

aB9> PN::TM:9ONCB9<SBC<9:JGJ<GN<PSC'o O29C
KBFFN ON'A SC<(" PF @B9> HL3<<9ONGS<ON
OBCC TMONKGN, OBCG2JC: TMN:O2BMMEJNOJMMJ9G: TM
® 8KSQJGCS9G FN<9N B, OSCGS>JGGS9COS>®
#: SJGGON<PKS9<<N::N@B9>KBFFN ON<SQBS:BJN<
icCB:KNS>SPKN8JGGSN PF3>TM PGSGON: SJGGN:
<BCFBGGN/# PF39CNSJG@ (Figure 1)

p2N<@B9> TM @BON< N 5@NDNOJMMJ9G NCS>JGGN
<:SCOS> CCB:KNS>S TM PBF@G TM:TM G2SOIBCP:JBC
O29CNSJGGN3 @B9>EN<SFQN<GN<@G9MJCNN: ON
?9S:N SJGGN<@9>.(s ® \#s3 SOS@:TM 96 L>B<
FBGGNS9NPPKN8JGGSN>FSGRN?9JN<:GNPS<O9<9IN:
>MNC9@B96S:JF9GS:JBCI

Fichier BCM

aB9> PKS?9Npe TM:9OJ TMGN<GBJ:NC<JBC{O TM MB>FS:JBC
BC: TM:TM:SQGJN< C8NS96SCS:BFJ?9N@ @>J>ON<
FN<9N< O5CSFBF TM:TM>J?9N<MMNP:9 TM:TM:9C
@B:BPBGB>FSGJ1#3I

f2NC<NFQGN<GBJ:NC<JBC{O TM MB>FBQJBC9N@B9>
9Cqpe, SJC<29NGN9JFNC<JBON<PNG9J:MB>FN9C
MJPKN<ONBCC TMNBJ@N>FMNO TM MJCQpe 8J>9NG,
9:JGJ<S@B96N<JF9GS:JBC9F TM>J?9N<I



FIGURE 1 : Vue des faces antérieure, médiale, postérieure et latérale du Scan 3D du sujet de l'étude.

f2B>OJCS:N9>JGJ<N<MJPKN@B9PSGP9G9N<<JBC
S@@GJ?9@N<@BJCNGS9FQN@S@B9J8J>9NG,
NCS@@GJ?9@S9BONS@GSPNI

fN @BL>FFN 9:JGJ<N:9CGBLJP3@G TM PJMS9@N6 TM
.fBLJPJN<@N<<JBC<@>TMGB@>@S>GN<N8JPNON
>NPKNPKNONJB@K5<J?9N<SQBS:BJN<CCB:KNS>

f2NC<NFQGN OJ<@B<J:JBCSFBF TM:>JS<BPJ TM 96
MJPKNFB>@KBGBLJ?9N<N: S9 PSGP9G N@N: 9C
<5<:"FN QN8N: TM!\$I

fN< @N<JBCS@>GJ?9@S9CNPKS9<<N::ONPGS<<N
PKN4GN<9IN: 8J>9NGO TM MJCG9KS9:, BC: SJC<J TM:TM
PSGP9G NCB:JGJ<SGN<SJGGN<9J8C:N<ONGS>JGGN
<:SJGGON<PKS9<<N::N@B9>KBFFN ON<SQBS:BJN<
icCB:KNS>_>SJGGNSJGGN S L>JGGS9COS>N: SJGGN
>S ONGS9B9NGGNJGGNI

Calcul des taux de couverture

cB9>SBC<TM 8G9G9S@SPON<@B9J:® KSQJGGN<
@S:JN<N<PSGP9G@B9PKSP9G N96ONPB98N>9N
ON<SL>JGGSN SJGGN<I

fN< @B9J:>MNC9<BCG2NC<NFQGNPKS9<<N::ON
PGS<<N@ TM PJMJ?9N<N<JC TM NCBFFN,OJ<@BCJQGN<
<9>GNFS>PK TM MS9JX BJ: (" FBO'GN<J<<9ON
%SQ>JPSC:<I

fN :S96ONPB98N>9N N: BQ:NCN<PSGP9GSCCBFQNI
ON @N><BCCN<O29CN@B@9GS:JBCC TM NQBC: GN<
FNC<9S:JBC>N:NC:OSC<GS>JGGN SJGGN@>B9
G2NMMEJNOJMMJ9G NPN::N@B@9GS:JBCI

Résultats

Morphologie de la jambe dans la population masculine française

fS >TM @SJBON<@ TM>JFN>ONGS PKN8JGGSN9FBGGN:
OSC<G2 TM PKSC:JGGS9{ "A SC<N: > "A SC<3N<:
JGG9<: Figure 2

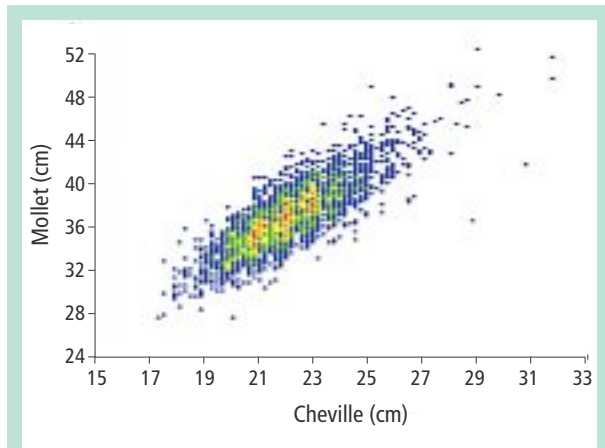


FIGURE 2 : Distribution des circonférences de cheville et de mollet dans un échantillon représentatif de la population masculine française âgée de plus de 18 ans. Chaque point du nuage représente un nombre de sujets qui est indiqué par sa couleur : bleu : < 5 ; vert : 5 à 9 ; jaune : 10 à 14 ; orange : 15 à 19 ; rouge : > 19.

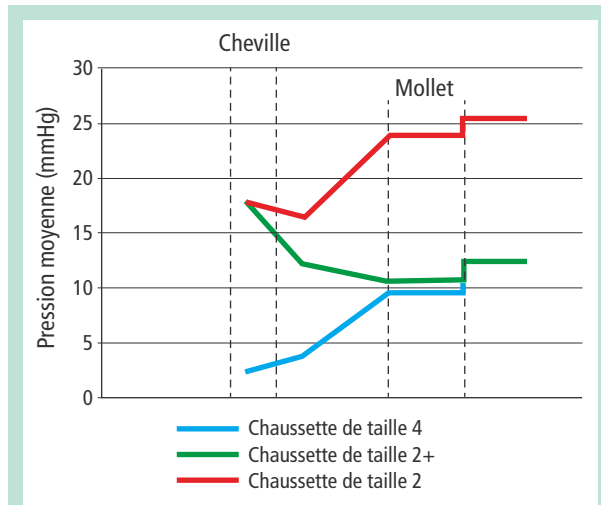


FIGURE 4 : Profil des pressions moyennes (de la cheville, à gauche, vers le mollet à droite) appliquées, chez le sujet virtuel, par une chaussette de taille 2, une de taille 4, et une de taille 2+.

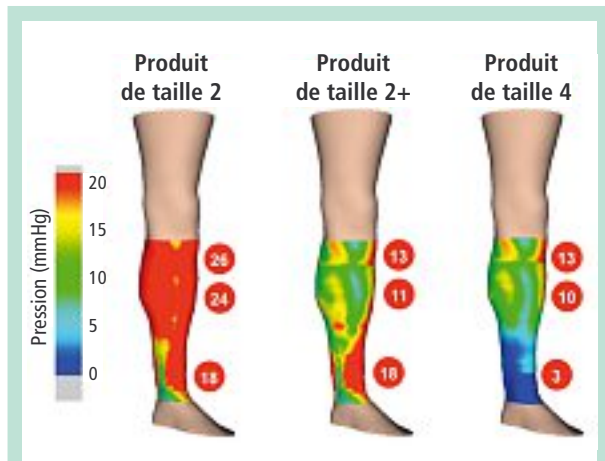


FIGURE 3 : Cartographie des pressions d'interface, dans les 3 configurations de taille.

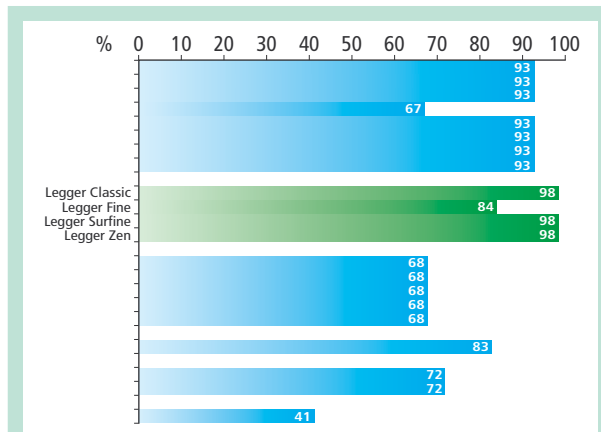


FIGURE 5 : Taux de couverture en taille de la population masculine française, âgée de 18 à 70 ans, par les chaussettes homme de classe 2.

aS> \$@>@B96 MNFFN<GN<BFFN<BC: NCFB5NCCN
ON<@™>JFN< ON FNQ>N @L'NFNC: <9@™>JN9><
;;(PF vs ;(; PF @B96\$PKN8JGON PF vs *!,* PF
@B9<GNFBGGN: S Q<@N><JCN>COJ8JO9N\$CB>
ON<SGN9>FB5NCCN<:<JFJGSUSC<GNON96<N<I

Pressions appliquées à la peau par une chaussette de classe 2

fN< PS>BL\$@>KJN3N<@N<<JBCS@>@GJ?9™>SC<GN<
*PBCMJS>JBCONSJGG@BC@>™>NC: Figure 3|

Í r8NP9CNPKS9<<N::ONSJGG<GNFBGGN<:<B9FJ<®
9CN@N<<JBCB>FSGM FFJL3, GNFBGGN<:
<B9FJ<® 9CN9>@N<<JBC# FFJL3 ?9JNC:<SDCN
JCB><JBCOJL>SOJNS6JSGON@N<<JBC (Figure 4)|

Í r8NP9CNPKS9<<N::ONSJGG<GNFBGGN<:<B9FJ<®
9CN@N<<JBCB>FSGM FFJL3, FSJ<G\$PKN8JGON:
@G9BF@>JF™>NFFJL3 0 @ \$<<JGN>SOJNS6JSG
ON@N<<JBC<JCB><™>|

Í r8NP9CNPKS9<<N::ONSJGG<GNFBGGN<:
<BC:<B9FJ<® ON<@N<<JBCB>FSGM FFJL ® S
PKN8JGON,FFJL S9 FBGGN:GSO™>N<<J8J:N<:
>N@NP: (Figure 4)|

Taux de couverture

oSC<G\$@>B@9GS:OBGy{"A SC<GN:<S96ONPB98N>9>N
8BC: ON%",!- @) y,* -, <S9M@B99C FBO'GNDBC:GS
L>JGONSJGGONPB98N ?9N#(- O N4SFQN (Figure 5)|

Les chaussettes de compression pour homme sont-elles bien adaptées à la population masculine française ? Quel impact sur la pression délivrée ?

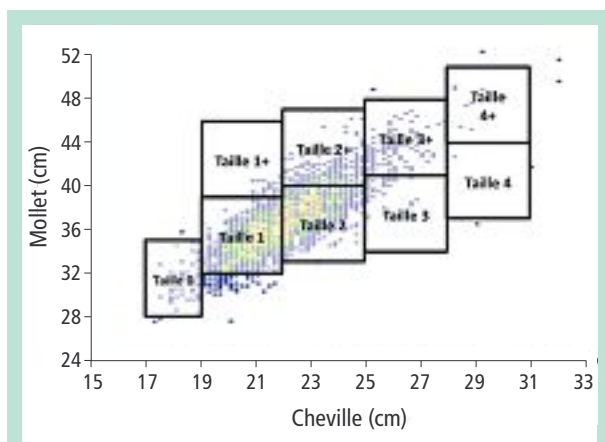


FIGURE 6 : Répartition des circonférences de cheville et de mollet dans la population masculine française, et grille de tailles des chaussettes Legger Classic, Legger Surfline et Legger Zen des Laboratoires Innothera.

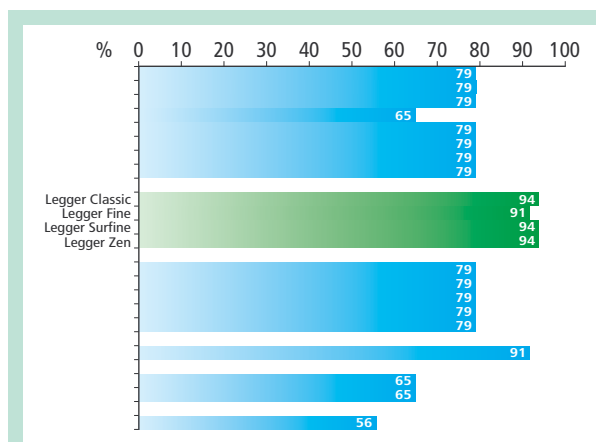


FIGURE 7 : Taux de couverture en taille de la population masculine française, âgée de 70 à 99 ans, par les chaussettes homme de classe 2.

Le taux de couverture de 98,3 % atteint par 3 modèles (Legger Classic®, Legger Surfline®, et Legger Zen® des Laboratoires Innothera) est obtenu grâce à la multiplication des tailles de la grille évoquée plus haut :

- ▣ SOIBCP:JB96?9S:N SJGGN<SCOS> \ (® #3O29CN :SJGGA@B96N<SFQN<GN@G94JCN<
- ▣ N ?9S:N SJGGN<@94 \ (s ® #s3 @B9<GN<L>B< FBGGN<SNPPKN8JCN<FSGN<JL%3I

Dans la population des plus de 70 ans, les taux de couverture vont de 55,9 % à 94,1 %. iP.B9<<GN<N<JGGN9>< :S96ONPB98>9>N <B<BQ:NC9K>`PN® G F9G:J@GJPS:JBC ON<SJGGN<S>JGGN<L3 @B@B<TM<SN<S<QBS:BJN< icCB:KNS

Conclusion

fN< FB>@KBGBL<SFQJ'N<,™GBJLC™ONG<FB5NCCN, @N98C:,:>N ® 2B>JLJC™29CNDJ<:B><JB9PKSF@ON @N<<JBONP™@S9CNPKS9<<N::S8NPJC8><JBO9 L>SOJNC:I

pN@BQG'FN@N9:;>N 8J:™L>`PN® 2SOIBCP:JBC9CN L>JGGN<SJGGN<SCOS>ONSJGGN<@G™FNC<SJ> rJC<JPN<SJCN<PKS9<<N::N<BFFN OJ<@BCJQ<ONGN FS>PK™MS<μSJ<,PBFFN fNLLN> pGS<4P fNLLN> J9>MJCN fNLLN>VNC<,BMME:9C:S96ONPB98>9>N ONG@B@9GS<B9CP9GJQ@BPKMNA<A-I

Contribution des auteurs : MC : rédaction, relecture. PR : rédaction scan 3D, relecture. FC : calcul des pressions, relecture. SB : calcul des TCV, relecture. TM : fichier morphologie, fichier BCM, relecture. GT : calcul des nuages en densité, relecture. AO : relecture.

Conflit d'intérêt : MC : activité de conseil pour Innothera.

Références

- (I pKS9N<S9el, p>B<m< qS<<N4I, kNGSON, nB9±NS9aI, JSQSONJG, eB<PS:JNGGB9PKNCM< SJGGN<QS<ON PBF@N<<JBCF™OJPSGN< K™FBO5CSFJ?98N<CN9<NI aKG™QBGB<QND % _((fyl
- ;I p9F9GFBQJGN9>(; FBJ<® S>JCA(I X@BCN<:ie] jNSG:KI
- *I intjI ^™MNC<JNC:KB@BF™:;>J?99ON @N><BCCSGJ<™NI ^S@<BE:N>CNI
- #I pN>JMJPON9SGJ:™B9Jp ^™MNC<JNC<KJ?9ON<P>J: @B9<N<S>K'<N<™GS<:J?9ONPBC:NC:JBON<FNFQ>N<I ^N8!r]'[r f; AA;I
- !! oJ<@B<JCMJONG<™GNP:JB9CS>K'<N ONPBC:NC:JBC N:® <BSOS@:S:JBCS FB>@KBGBL<SFQJ'N< qN8: C4m^y!;#;(I ;AA#I