

**Supplementary Table S1. Muscles and muscle groups analyzed in each thigh.**

<b>Compartments</b>	<b>Muscles</b>
Gluteal	Gluteus maximus
Lateral rotator group	Obturator internus Obturator externus
Anterior	Rectus femoris Vastus medialis Vastus intermedius Vastus lateralis Sartorius
Medial	Gracillis Adductor longus Adductor brevis Adductor magnus
Posterior	Semimembranosus Semitendinosus Biceps femoris

**Supplementary Table S2. Difference in the percentage of thigh MRI findings between right and left thighs.**

	IMNM			IBM (n=153)	PM (n=176)	DM (n=219)	CADM (n=17)	Total (n=666)
	Total (n=101)	HMGCR (n=50)	SRP (n=22)					
	mean(SD)	mean(SD)	mean(SD)					
<b>Absolute difference</b>								
<b>Edema</b>	3.4(5.1)	3.0(5.1)	3.4(4.0)	3.8(5.5)	3.3(5.5)	3.2(6.2)	1.2(2.6)	3.3(5.6)
<b>Atrophy</b>	1.8(5.6)	0.8(2.6)	2.5(5.1)	2.5(5.2)***	0.7(2.6)*	0.7(3.7)*	2.0(8.1)	1.3(4.4)
<b>Fatty replacement</b>	2.6(6.0)**	2.3(6.2)	4.5(6.9)	2.1(4.0)*	1.2(3.5)	0.9(2.9)**	0.0(0.0)	1.5(3.9)
<b>Fascial edema</b>	1.6(3.9)	0.9(2.2)**	4.1(6.4)**	1.6(3.6)	1.3(3.6)	2.2(4.7)*	0.8(3.2)	1.7(4.0)
<b>Right minus left side</b>								
<b>Edema</b>	0.8(6.1)	1.0(5.8)	0.3(5.3)	-0.3(6.7)	-0.2(6.4)	0.1(7.0)	0.4(2.9)	0.0(6.5)
<b>Atrophy</b>	0.7(5.8)	0.8(2.6)	1.9(5.4)	-0.2(5.8)	0.1(2.7)	-0.2(3.7)	-2.0(8.1)	-0.0(4.6)
<b>Fatty replacement</b>	-0.0(6.5)	-0.4(6.7)	2.2(7.9)	0.2(4.5)	0.2(3.7)	0.0(3.0)	0.0(0.0)	0.1(4.2)
<b>Fascial edema</b>	-0.3(4.2)	-0.3(2.3)	-1.6(7.4)	0.6(3.8)	0.2(3.8)	0.6(5.2)	0.8(3.2)	0.4(4.4)

\* <0.05; \*\* <0.01; \*\*\* <0.001

IMNM: necrotizing myopathy; IBM: inclusion body myositis; PM: polymyositis; DM: dermatomyositis; CADM: clinically amyopathic dermatomyositis

Mean percentage of each major clinical group (IMNM, IBM, PM, DM and CADM) compared with the rest of the sample using Student's t-test. Anti-HMGCR and anti-SRP patients were compared between them (anti-HMGCR with anti-SRP and vice versa).

**Supplementary Table S3. Correlation of the different thigh MRI features among the different clinical groups**

	IMNM			IBM(n=153)	PM(n=176)	DM(n=219)	CADM(n=17)	Total(n=666)
	Total (n=101)	HMGCR(n=50)	SRP(n=22)					
	Corr. coeff	Corr. coeff	Corr. coeff					
<b>Atrophy vs. Fatty replac.</b>	0.48***	0.47***	0.54**	0.47***	0.42***	0.45***	0.84***	0.54***
<b>Edema vs. Fatty replac.</b>	0.27**	0.18	0.20	0.40***	0.37***	0.28***	-0.03	0.39***
<b>Edema vs. Atrophy</b>	0.31**	0.23	0.22	0.05	0.37***	0.27***	-0.01	0.33***
<b>Edema vs. Fascial edema</b>	0.31**	0.26	0.48*	0.04	0.38***	0.49***	0.80***	0.30***
<b>Fatty replac. vs. Fascial edema</b>	0.01	0.01	0.06	-0.12	0.02	0.18**	0.19	-0.02
<b>Atrophy vs. Fascial edema</b>	0.03	0.09	-0.02	-0.10	0.12	0.05	0.26	-0.06

\* <0.05; \*\* <0.01; \*\*\* <0.001

IMNM: necrotizing myopathy; IBM: inclusion body myositis; PM: polymyositis; DM: dermatomyositis; CADM: clinically amyopathic dermatomyositis  
Correlation was calculated using Pearson's correlation coefficient.

**Supplementary Table S4. Prevalence of the different features among the different clinical groups**

	IMNM			IBM (n=153)	PM (n=176)	DM (n=219)	CADM (n=17)	Total (n=666)
	Total (n=101)	HMGCR (n=50)	SRP (n=22)					
	% (n)	% (n)	% (n)					
<b>Gluteal edema</b>	56% (57)***	58% (29)	68% (15)	31% (48)	34% (60)	38% (83)	18% (3)	38% (251)
<b>Lat. rot. edema</b>	40% (40)***	34% (17)*	59% (13)*	13% (20)***	24% (42)	29% (64)	6% (1)	25% (167)
<b>Anterior edema</b>	85% (86)***	82% (41)	95% (21)	94% (144)***	52% (92)***	51% (111)***	18% (3)***	65% (436)
<b>Medial edema</b>	75% (76)***	80% (40)	91% (20)	76% (117)***	47% (83)**	43% (95)***	12% (2)***	56% (373)
<b>Posterior edema</b>	80% (81)***	84% (42)	91% (20)	78% (120)***	48% (84)**	40% (87)***	6% (1)***	56% (373)
<b>Interfascial edema</b>	5% (5)	4% (2)	0%	3% (5)*	7% (13)	10% (21)	18% (3)	7% (47)
<b>Gluteal atrophy</b>	22% (22)***	20% (10)	36% (8)	10% (15)	11% (20)	7% (16)*	0%	11% (73)
<b>Lat. rot. atrophy</b>	43% (43)***	40% (20)*	73% (16)*	25% (38)	19% (33)	8% (18)***	0%*	20% (132)
<b>Anterior atrophy</b>	33% (33)	26% (13)*	50% (11)*	76% (116)***	22% (39)**	10% (21)***	12% (2)	32% (211)
<b>Medial atrophy</b>	36% (36)**	32% (16)*	64% (14)*	45% (69)***	20% (35)	7% (16)***	6% (1)	24% (157)
<b>Posterior atrophy</b>	27% (27)**	24% (12)	41% (9)	32% (49)***	12% (21)*	8% (18)***	0%	17% (115)
<b>Gluteal fatty replacement</b>	54% (55)***	60% (30)	55% (12)	39% (59)	45% (79)	29% (63)***	29% (5)	39% (261)
<b>Lat. rot. fatty replacement</b>	35% (35)***	32% (16)*	59% (13)*	19% (29)	18% (31)	6% (14)***	0%	16% (109)
<b>Anterior fatty replacement</b>	51% (52)	42% (21)*	73% (16)*	88% (134)***	44% (77)	28% (62)***	12% (2)**	49% (327)
<b>Medial fatty replacement</b>	54% (55)*	52% (26)	73% (16)	68% (104)***	43% (75)	24% (53)***	6% (1)**	43% (288)
<b>Posterior fatty replacement</b>	66% (67)**	64% (32)	77% (17)	73% (112)***	50% (88)	36% (79)***	12% (2)***	52% (348)
<b>Gluteal fascial edema</b>	14% (14)	16% (8)	16% (8)	16% (25)	10% (18)	12% (27)	12% (2)	13% (86)
<b>Lat. rot. fascial edema</b>	7% (7)	6% (3)	6% (3)	5% (7)	5% (8)	8% (18)	0%	6% (40)
<b>Anterior fascial edema</b>	21% (21)	12% (6)	12% (6)	13% (20)***	16% (28)**	38% (84)***	12% (2)	23% (155)
<b>Medial fascial edema</b>	13% (13)*	8% (4)	8% (4)	11% (17)***	18% (32)	33% (72)***	24% (4)	21% (138)
<b>Posterior fascial edema</b>	12% (12)**	10% (5)	10% (5)	21% (32)	17% (30)*	38% (83)***	24% (4)	24% (161)

\* <0.05; \*\* <0.01; \*\*\* <0.001

IMNM: necrotizing myopathy; IBM: inclusion body myositis; PM: polymyositis; DM: dermatomyositis; CADM: clinically amyopathic dermatomyositis  
 Prevalence of each major clinical group (IMNM, IBM, PM, DM and CADM) was compared with the rest of the sample. Anti-HMGCR and anti-SRP patients were compared between them (anti-HMGCR with anti-SRP and vice versa). Chi-squared test or Fisher's exact test were used as appropriate.

**Supplementary Table S5. Multivariate analysis of the extent of the different thigh MRI features (percentage of muscles involved) among different clinical subsets using fractional probit regression after excluding patients with possible DM and PM .**

	<b>Edema</b> dy/dx (95%CI)	<b>Atrophy</b> dy/dx (95%CI)	<b>Fatty replacement</b> dy/dx (95%CI)	<b>Fascial edema</b> dy/dx (95%CI)
<b>Clinical subset</b> (referenced to IMNM)				
<b>IBM</b>	-7.14 [-15.01,0.73]	0.80 [-4.91,6.52]	-0.28 [-7.82,7.26]	1.13 [-4.89,7.14]
<b>PM</b>	-20.22 [-28.09,-12.35]***	-8.65 [-15.28,-2.03]*	-9.54 [-17.37,-1.72]*	0.43 [-4.65,5.51]
<b>DM</b>	-20.64 [-28.47,-12.81]***	-18.90 [-25.40,-12.39]***	-16.30 [-23.62,-8.99]***	10.39 [5.80,14.98]***
<b>CADM</b>	-66.29 [-91.44,-41.15]***	-28.52 [-43.05,-13.98]***	-33.12 [-49.15,-17.09]***	1.87 [-7.27,11.01]
<b>Age at onset</b> (10 years)	0.35 [-1.68,2.38]	2.17 [0.36,3.97]*	1.73 [-0.24,3.69]	-0.80 [-1.79,0.19]
<b>Time from onset to MRI</b> (logarithm of months)	-10.78 [-16.98,-4.57]***	10.93 [5.98,15.89]***	16.89 [11.28,22.49]***	-4.75 [-7.76,-1.73]**
<b>Sex</b> (female)	-10.17 [-15.62,-4.72]***	2.95 [-1.23,7.13]	-9.63 [-14.55,-4.71]***	-3.37 [-6.58,-0.17]*
<b>Race</b> (referenced to white patients)				
<b>Black</b>	2.19 [-6.44,10.82]	-0.22 [-7.26,6.81]	8.01 [0.39,15.62]*	-0.63 [-5.61,4.35]
<b>Other races</b>	1.99 [-6.88,10.87]	4.77 [-1.80,11.34]	2.01 [-6.32,10.34]	-1.05 [-5.60,3.50]

\* <0.05; \*\* <0.01; \*\*\* <0.001

dy/dx: Marginal effect (% change of the dependent variable for each 1 point of the predictor variables)

MRI: magnetic resonance imaging; IBM: inclusion body myositis; IMNM: necrotizing myopathy; PM: polymyositis; DM: dermatomyositis; CADM: clinically amyopathic dermatomyositis

Supplementary Table S6: Most relevant muscles and muscle features for each diagnostic group.

Immune mediated necrotizing myositis		Inclusion body myositis		Polymyositis		Dermatomyositis	
	OR [95%CI]		OR [95%CI]		OR [95%CI]		OR [95%CI]
Adductor brevis edema	3.3 [1.9,5.8]***	Vastus lateralis fatty replacement	8.7 [4.5,16.9]***	Rectus femoris edema	0.5 [0.3,0.7]***	Vastus medialis atrophy	0.3 [0.1,0.5]***
Semitendinosus fascial edema	0.1 [0.0,0.3]***	Vastus medialis atrophy	3.8 [2.0,7.3]***	Rectus femoris fascial edema	0.3 [0.1,0.6]**	Rectus femoris fascial edema	3.7 [1.9,7.1]***
Obturator externus atrophy	4.6 [2.4,8.9]***	Obturator internus edema	0.2 [0.1,0.4]***			Biceps femoris edema	0.2 [0.1,0.3]***
Vastus lateralis fatty replacement	0.3 [0.1,0.5]***	Vastus intermedius edema	3.9 [2.1,7.2]***			Semimembranosus fascial edema	2.9 [1.7,4.8]***
Biceps femoris edema	3.6 [2.0,6.4]***	Gluteus maximus fatty replacement	0.4 [0.2,0.7]***			Vastus medialis fatty replacement	0.4 [0.2,0.6]***
Obturator internus fatty replacement	2.7 [1.3,5.5]**	Adductor brevis edema	0.2 [0.1,0.4]***			Sartorius edema	2.0 [1.2,3.2]**
Gracillis atrophy	0.3 [0.1,0.8]*	Adductor magnus edema	3.0 [1.6,5.6]***				
		Adductor longus atrophy	0.2 [0.1,0.5]***				
		Gracillis atrophy	3.8 [1.6,9.0]**				
		Gracillis fascial edema	0.3 [0.1,0.8]*				

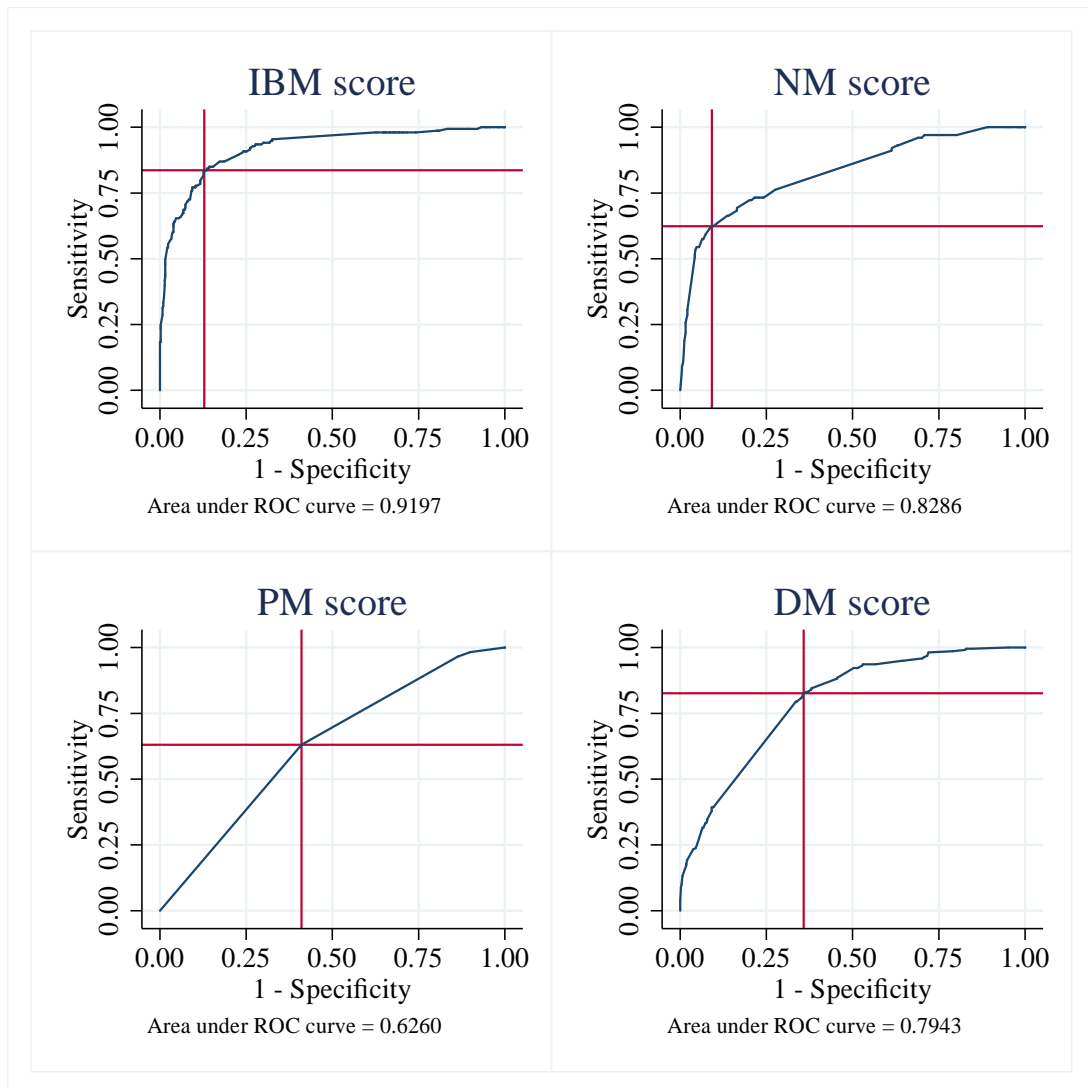
\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Supplementary Table S7: Diagnostic performance of the scoring formulas using the cutoff that maximized Youden's index.**

Score	Formula	AUC(95%CI)	cAUC	Best cutoff	Sensitivity	Specificity	PPV	NPV
IMNM	$1/(1+\exp(-1.21 * E_{\text{abbrev}} + 2.45 * F_{\text{semit}} - 1.52 * A_{\text{obtexternus}} + 1.33 * R_{\text{vaslat}} - 1.27 * E_{\text{bicfemoris}} - 1.00 * R_{\text{obtinternus}} + 1.20 * A_{\text{gra}} + 2.53))$	0.83(0.78-0.88)	0.78	0.2	62.4	90.8	54.8	93.1
IBM	$1/(1+\exp(-2.17 * R_{\text{vaslat}} - 1.33 * A_{\text{vasmedialis}} + 1.70 * E_{\text{obtinternus}} - 1.37 * E_{\text{vasintermedius}} + 1.00 * R_{\text{glutmax}} + 1.60 * E_{\text{abbrev}} - 1.09 * E_{\text{addmag}} + 1.65 * A_{\text{addlon}} - 1.34 * A_{\text{gra}} + 1.14 * F_{\text{gra}} + 2.97))$	0.92(0.89-0.95)	0.89	0.3	83.7	87.1	66.0	94.7
PM	$1/(1+\exp(0.74 * E_{\text{rectfemoris}} + 1.34 * F_{\text{rectfemoris}} + 0.59))$	0.63(0.58-0.67)	0.58	0.3	63.1	59.0	35.6	81.6
DM	$1/(1+\exp(1.30 * A_{\text{vasmedialis}} - 1.30 * F_{\text{rectfemoris}} + 1.59 * E_{\text{bicfemoris}} - 1.05 * F_{\text{semim}} + 0.95 * R_{\text{vasmedialis}} - 0.67 * E_{\text{sar}} + 0.26))$	0.79(0.76-0.83)	0.76	0.3	82.6	64.2	53.1	88.3

IMNM: necrotizing myopathy; IBM: inclusion body myositis; PM: polymyositis; DM: dermatomyositis; CADM: clinically amyopathic dermatomyositis

**Supplementary Figure S1. Diagnostic utility of the thigh MRI scoring formulas (from Supplementary Table S7) in necrotizing myositis (NM), inclusion body myositis (IBM), polymyositis (PM) and dermatomyositis (DM).\***



\*Receiver operating characteristic (ROC) curves.