Appendix A: Quality Ratings of Included Articles

Reliability – Quality Appraisal of Diagnostic Reliability (QAREL) Scores						
Author	**Yes**	**No**	**Unclear**	**NA**	**Issues**	**Quality Grade**
Clinical Exam - Reliability						
Lee 2005	4	0	7	0	Rater representation unclear Blinding unclear Time interval unclear	II
Deng 2015	4	0	5	2	Blinding unclear Time interval unclear	II
Questionnaire - Reliability						
Norman 2001	5	0	6	0	Blinding unclear Order of exam unclear if varied Test application unclear if correct technique	II
Ridner 2015	3	0	7	1	Blinding unclear Time interval unclear	II
Bioelectric Impedance - Reliability						
Jain 2010	5	0	6	0	Blinding unclear Time interval unclear	II
Newman 2013	5	0	5	1	Single rater Blinding unclear Order of exam unclear if varied	II
Fu 2013	4	2	4	1	Raters undefined Raters unblinded	II
Moseley 2008	4	0	7	1	Single rater Blinding unclear Order of exam unclear if varied Time interval unclear	II
Svensson 2015	3	1	5	1	Most subjects without breast cancer Raters undefined Blinding unclear	III
Dylke2014	3	0	8	0	Raters undefined Blinding unclear Order of exam not varied Time interval unclear	III

Appendix A: Quality Ratings of Included Articles

Czerinec 2010	3	2	6	0	Raters undefined Blinding unclear Raters knew medical history Order of exam not varied Time interval unclear	III
Circumferential Measures - Reliability						
Borthwick 2013 (Hand)	9	0	2	0	Some blinding unclear	I
Galland 2002	7	0	4	0	Blinding unclear Order and time of exam unclear	I
Galiano-Castillo 2014	7	0	2	2	Some blinding unclear	I
Gjorup 2010	7	1	3	0	Some blinding unclear Order of exam not varied	I
Deltombe 2007	6	0	5	0	Blinding unclear	I
Chen 2008	6	0	5	0	Some blinding unclear Order of examination unclear Application of test unclear	I
Purcell 2016 (HN)	6	0	3	2	Some blinding unclear Varied order of exam unclear	I
Katz-Leurer 2012	6	0	5	0	Blinding unclear Order of exam varied unclear	I
Newman 2013	5	0	5	1	Single rater Blinding unclear Order of exam unclear if varied	II
Devoogt 2010	5	0	6	0	Blinding unclear Order of examination unclear Examination application unclear	II
Norman 2001	5	0	6	0	Blinding unclear Order of exam unclear Examination application unclear	II
Mori 2015	5	0	6	0	Blinding unclear Order of exam unclear	II
Meijer 2004	5	0	6	0	Unclear if raters are representative Blinding unclear	II
Karges 2003	5	2	3	1	Rater not blinded Order of examination unclear if varied	II
Megens 2001	5	2	3	1	Order of exam not varied	II

Appendix A: Quality Ratings of Included Articles

					Raters not blinded to previous findings Unclear blinding for other information Time interval between measures unclear	
Sander 2002	4	2	5	0	Not Blinded Order of examination not varied	II
Brorson 2012	4	1	5	1	Blinding unclear to prior findings or reference standard Order of exam unclear Timing unclear	II
Taylor 2006	4	0	7	0	Blinding unclear Order of examination unclear Timing unclear	II
Czerinec 2010	3	2	6	0	Raters undefined Blinding unclear Raters knew medical history Order of exam not varied Time interval unclear	II
Yamamoto 2013	2	0	9	0	Raters unclear Blinding unclear Unclear time interval	II
Kim 2008	3	1	7	0	Healthy subjects Blinding unclear Order of exam unclear if varied	III
Foroughi 2011	3	3	5	0	Sample not representative Blinding unclear Order of exam not varied Time interval not appropriate	III
Water Displacement – Reliability						
Borthwick 2013 (Hand)	9	0	2	0	Some blinding unclear	I
Galland 2002	7	0	4	0	Blinding unclear Order and time of exam unclear	I
Sagan 2005	7	1	3	0	Blinding unclear Order of examination not varied	I
Gjorup 2010	7	1	3	0	Some blinding unclear	I

Appendix A: Quality Ratings of Included Articles

					Order of exam not varied	
Chen 2008	6	0	5	0	Some blinding unclear	I
Deltome 2007	6	0	5	0	Blinding unclear	I
Meijer 2004	5	0	6	0	Unclear if raters are representative Blinding unclear	II
Mori 2015	5	0	6	0	Blinding unclear Order of exam unclear	II
Damstra 2006	5	1	5	0	Unclear blinding Order of exam not varied	II
Megens 2001	5	2	3	1	Order of exam not varied Raters not blinded to previous findings Unclear blinding for other information Time interval between measures unclear	II
Karges 2003	5	2	3	1	Rater not blinded Order of examination unclear if varied	II
Taylor 2006	4	0	7	0	Blinding unclear Order of examination not varied Time interval unclear	II
Sander 2002	4	2	5	0	Not Blinded Order of examination not varied	II
Brorson 2012	4	1	5	1	Blinding unclear to prior findings or reference standard Order of exam unclear Timing unclear	II
Erends 2014	4	1	5	1	Healthy subjects only Some blinding unclear	III
Tsang 2012	2	0	6	3	Sample subjects may not be representative Blinding unclear Order of exam N/A Interval between exams unclear	III

Appendix A: Quality Ratings of Included Articles

Lette 2006	2	0	9	0	Raters and subject unclear representative of population Blinding unclear Time interval unclear	III
Mckinnon 2007	2	0	9	0	Raters and subject unclear representative of population Blinding unclear Order of exam unclear if varied Time interval unclear	III
Perometry - Reliability						
Deltombe 2007	6	0	5	0	Blinding unclear	I
Ancukiewicz 2011	6	0	3	2	Blinding unclear	I
Adriaenssens 2013	5	0	5	1	Blinding unclear Unclear time interval	II
Lee 2011	4	0	7	0	Raters undefined Blinding unclear Time interval unclear	II
Dylke 2014	4	1	6	0	Raters undefined Blinding unclear Order of exam not varied	II
Czerinec 2010	3	2	6	0	Raters undefined Blinding unclear Raters knew medical history Order of exam not varied Time interval unclear	II
3D Scanning - Reliability						
Ohberg 2014	5	1	5	0	Unclear blinding Healthy subjects only Order of exam not varied	III
Erends 2014	4	1	5	1	Healthy subjects only Some blinding unclear	III
Mckinnon2007	2	0	9	0	Raters and subject unclear Not representative of population Blinding unclear Order of exam unclear if varied Time interval unclear	III

Appendix A: Quality Ratings of Included Articles

Tissue Dielectric Constant - Reliability						
Purcell 2016 (HN)	6	0	3	2	Some blinding unclear Varied order of exam unclear	I
Mayrovitz 2009	4	1	6	0	Blinding unclear Order of exam not varied	II
Mayrovitz 2015	3	0	7	1	Raters unclear Blinding unclear Time interval unclear	II
Ultrasound - Reliability						
Kim 2008	3	1	7	0	Healthy subjects Blinding unclear Order of exam unclear if varied	III
Hwang 2014	1	1	8	1	Healthy subjects Blinding unclear Order of exam unclear if varied Interval unclear	III
DXA - Reliability						
Gjorup 2010	7	1	3	0	Some blinding unclear Order of exam not varied	I
Newman 2013	5	0	5	1	Single rater Blinding unclear Order of exam unclear if varied	II
Lymphoscintigraphy - Reliability						
Dylke 2013	5	0	6	0	Blinding unclear Order of exam unclear if varied Time interval unclear	II
DeVoogdt 2014	5	0	4	2	Blinding unclear	II
Tonometry - Reliability						
Chen 2008	6	0	5	0	Some blinding unclear	I
Bagheri 2005	5	0	6	0	Blinding unclear Order of exam unclear if varied Time interval unclear	II
Moseley 2008	4	0	7	1	Single rater Blinding unclear Order of exam unclear if varied Time interval unclear	II

Appendix A: Quality Ratings of Included Articles

Diagnostic Validity – Quality Assessment of Diagnostic Accuracy Studies – 2 (QUADAS-2) Scores[a] For Convergent Validity Studies – Measure Compared to in Parentheses						
Questionnaires: Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Bulley 2013 Quality of life Functional Assessment, MST, LBCQ (Per)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability *Rating applies to all measures	Unclear risk bias Low concern applicability	High risk bias	Unclear sampling methodology Unclear blinding Unclear thresholds Not all subjects included in analysis	II
Bulley 2014 Morbidity Screening Tool (Per, FACT, DASH)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Sampling unclear Blinding unclear Not all subjects received reference standard Not all subjects included in analysis	II
Ridner 2015 LSIDS-A (FACT-B+4, others)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Multiple study samples and techniques Case-Control populations Unclear blinding	II/III

Appendix A: Quality Ratings of Included Articles

					Multiple reference standards used Not all subjects received same standard	
Armer 2003 LBCQ (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study Unclear blinding Unclear threshold Unclear interval	III
Czerniec 2010 10 cm VAS	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Case control study Sampling unclear Threshold not pre-specified Unclear reference standard	III
Ridner 2007 LBCQ (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study No pre-specified threshold Not all patients included in analysis	III

[a] *DASH=Disabilities of the Arm, Shoulder and Hand; FACT=Functional Assessment of Cancer Therapy; FACT B+4=Functional Assessment of Cancer Therapy for Breast Cancer; LBCQ=Lymphedema and Breast Cancer Questionnaire; LSIDS-A=Lymphedema Symptom Intensity and Distress Survey – Arm; MST=Morbidity Screening Tool; VAS=Visual Analog Scale*

BIS – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**

Appendix A: Quality Ratings of Included Articles

Jain 2010 MF BIS SFB7 (Per)	Low risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Threshold not pre-specified Unclear methodology	I
York, 2009 SFBIS model XCA (BIS SFB7)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear study design	II
Fu 2013 BIA (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Low risk bias	Purposive sampling method Unclear blinding	II
Blaney 2015 Single frequency BIA (CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Unclear sampling method Unclear blinding Not all subjects included in analysis	II
Bundred 2015 BIS (CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Unclear sampling method Unclear exclusions Unclear blinding Not all subjects included in analysis	II
Shah 2013 BIS – L-Dex U400 (clinical symptoms, CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Low risk bias	Unclear sampling method Unclear blinding reference test Unblinded to index test	II
Ward 2009	High risk bias	Unclear risk bias	Unclear risk bias	Low risk bias	Case-control study	III

Appendix A: Quality Ratings of Included Articles

MF BIS SF B7 (Per)	Low concern applicability	Low concern applicability	Low concern applicability		Unclear methodology	
Sakuda 2010 BIS 4000C (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study Not all patients included in analysis	III
Czierniec 2011 BIS (Per)	High risk bias Low concern applicability	Low risk bias Unclear concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study Unclear methodology	III
Kim, 2011 BIS Inbody 720 ECF ratios (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III
Dylke 2014 SFB7 (Perometry)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Sample of convenience Unclear blinding Threshold not pre-specified	III
Svensson 2015 BIS (CM)	High risk bias High concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Subjects self-selected Case-control study Most subjects without breast cancer Unclear blinding	III

Appendix A: Quality Ratings of Included Articles

Ridner 2007 (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study No pre-specified threshold Not all patients included in analysis	III
Czerniec 2010	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Case – control Sampling unclear Threshold not pre-specified Unclear reference standard	III

Circumferential Measures – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Borthwick 2013 Figure 8 for hand (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias Low concern applicability	Low risk bias	Unclear sampling Unclear if inappropriate exclusions Unclear if pre-specified threshold	I
Tewari 2008 (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Time intervals not stated Blinding unclear	II
Mejier 2004 (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Sampling unclear All subjects with condition	II

Appendix A: Quality Ratings of Included Articles

					Unclear blinding	
DeVoogdt 2010 (WD)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear sampling technique Unclear exclusions Unclear timing and knowledge of other results Threshold not pre-specified	II
Sander 2002 (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias	Unclear sampling of subjects Reference standard results interpreted with knowledge of index results Unclear interval between tests	II
Karges, 2003 (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Not all patients included in analysis Unclear blinding Unclear threshold	II
Mori 2015 (WD)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Unclear sampling Unclear blinding	II
Yamamoto 2013 UE Lymphedema Index (Campisi	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias	Unclear sampling method Unclear exclusions Unclear blinding Validity of reference standard	III

Appendix A: Quality Ratings of Included Articles

clinical staging tool)					Unclear time interval	
Brorson 2012 (WD/pleths)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Sample selection Case-control study Exclusion criteria not given Threshold not specified Blinding unclear Interval unspecified	III
Taylor 2006 (WD)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study Unclear blinding	III
Foroughi 2011 (Per)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Healthy subjects only Threshold was not pre-specified Unclear blinding Not all patients included in analysis	III
Yamamoto 2016 Lymphedema Index (CM truncated cone)	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias High concern applicability	Unclear risk bias	Healthy subjects only Unclear blinding Unclear time interval	III

Appendix A: Quality Ratings of Included Articles

Czerniec 2010	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Case – control Sampling unclear Threshold not pre-specified Unclear reference standard	III
Purcell 2016 MMD and Tape measure (*MDACC HNL rating Scale)*	High risk bias Low concern applicability	Low risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III

Water Displacement – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Damstra 2006 Inverse WD (CM, BIS, Per)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias Low concern applicability	Low risk bias	Thresholds not specified Blinding unclear	I
Lette 2006 Home-made Vol (standard Vol)	Unclear risk bias Unclear risk applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear study design Unclear blinding Unclear time interval	II

Appendix A: Quality Ratings of Included Articles

Sagen 2009 WD (CT/MRI)	High Risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study	III

Perometry – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Ancuklewicz 2012	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear exclusions Some unclear blinding Unclear time interval	II
Adriaenssens 2013 Mobile Perometer (CM and WD)	Unclear risk bias High concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-Control Study Blinding unclear Appropriate time interval unclear	III
Dylke 2012 (truncated cone)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Healthy subjects Unclear methodology Not all patients included in analysis	III
Lee 2011 (WD)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk Bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III

Appendix A: Quality Ratings of Included Articles

Stout 2011 Per – truncated cone formula (Per - segments)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study Unclear blinding Not all subjects included in analysis	III
Ridner 2007 (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study No pre-specified threshold Not all patients included in analysis	III
3D Imaging (Volume) – Validity						
Ohberg 2014 (WD)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Unclear blinding	II
Lu 2014 3D Imaging system (Water Displacement)	Unclear risk bias High concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk of bias	7 subjects, unclear population Unclear blinding	III
Lu 2013 3D Imaging system (Perometry)	High risk bias High concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Small population, only 1 with condition Unclear blinding	III
Erends 2014 (WD)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk of bias	Healthy controls only Unclear blinding	III

Appendix A: Quality Ratings of Included Articles

McKinnon 2007 Laser scanning (WD)	Unclear risk bias High concern applicability	Low risk bias Unclear concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Use of objects +10 human subjects	IV
Tissue Dielectric Constant – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Mayrovitz 2015 (groups and symptoms)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear sampling method Unclear blinding Unclear time interval	II
Mayrovitz 2015 (CM, BIS)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias	Unclear sampling method Unblinded raters Not all subjects included in analysis	II
Purcell 2015 MMD and Tape measure (*MDACC HNL rating Scale)*	High risk bias Low concern applicability	Low risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III
Mayrovitz 2009 MMD (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III

Appendix A: Quality Ratings of Included Articles

Mayrovitz 2008 MMD (CM)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Case-control study Unclear blinding	III
Mayrovitz 2007 MMD (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study Threshold not pre-specified Unclear blinding Unclear time interval	III

Diagnostic Imaging – Validity						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Gjorup 2010 DEXA (CM & WD)	Unclear risk Bias Low concern applicability	Unclear risk Bias Low concern applicability	Unclear risk Bias Low concern applicability	Low risk of bias	Unclear methodology	I
Adriaenssens 2012 Ultrasound elastography (HF US)	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	High risk bias	Unclear methodology Not all patients included in analysis	II
Balzarini 2001 Ultrasound	Unclear risk bias	Unclear risk bias	Unclear risk bias	Unclear risk bias	Unclear sampling method	II

Appendix A: Quality Ratings of Included Articles

(circumferential, clinical impression)	Low concern applicability	Low concern applicability	Low concern applicability		Unclear exclusion criteria Unclear blinding Unclear time interval	
Choi 2014 Ultrasound (BIA, CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk of bias	Unclear sampling method Unclear exclusions Unclear blinding	II
Brorson 2006 CT (WD)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias Low concern applicability	Unclear risk bias	Limited patient population Unclear sampling Exclusion bias Unclear interval	II
Brorson 2009 DEXA (WD)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias Low concern applicability	Unclear risk bias	Limited patient population Unclear sampling Exclusion bias Unclear interval	II
Donahue 2015 CEST MRI (lymphedema stage)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Small population Case-control design Unclear blinding	III
Santin 2014 DEXA (Perometry)	High risk bias	Unclear risk bias	Unclear risk bias	Unclear risk bias	Healthy population Unclear blinding	III

Appendix A: Quality Ratings of Included Articles

	High concern applicability	Low concern applicability	Low concern applicability			
Hwang 2014 Ultrasound (perometry)	High risk bias High concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Healthy population only Unclear blinding	III
Mellor 2004 Ultrasound (Perometer)	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk of bias	Case-control study (opposite arm) Unclear blinding Unclear if threshold pre-set	III
Other Measures – Validity						
Mirnajafi 2004 Torsional Rigidity (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Case-control study Threshold not pre-specified Blinding unclear Not all subjects included in analysis	III

Appendix A: Quality Ratings of Included Articles

Diagnostic Accuracy - Quality Assessment of Diagnostic Accuracy Studies – 2 (QUADAS-2) Scores						
Author	**Domain 1: Patient Selection**	**Domain 2: Index Test(s)**	**Domain 3: Reference Standard**	**Domain 4: Flow and Timing**	**Issues**	**Quality Rating**
Questionnaire - Diagnostic Accuracy						
Smoot 2011 Norman Q (prior dx)	Low risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Some blinding unclear Reference standard poorly defined	II
Bulley 2013 Quality of life Functional Assessment, MST, LBCQ (Per)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability *Rating applies to all measures	Unclear risk bias Low concern applicability	High risk bias	Unclear sampling methodology Unclear blinding Unclear thresholds Not all subjects included in analysis	II
Hayes 2008	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear exclusions Unclear blinding Unclear time interval	II
Hayes 2005	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear exclusions Unclear blinding Unclear time interval	II
Norman 2001 Telephone questionnaire	High risk bias	Low risk bias	Low risk bias	High risk bias	Case-control study	III

Appendix A: Quality Ratings of Included Articles

(CM)	Low concern applicability	Low concern applicability	Low concern applicability		Interval not appropriate	
Asim 2012 Quality of life questionnaire (CM)	High risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias	Case-control study Blinding Not all patients included in analysis	III
BIS - Diagnostic Accuracy						
Smoot 2011 (prior dx)	Low risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Some blinding unclear Reference standard poorly defined	II
Cornish 2001	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear blinding	II
Berlit 2013 (CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk Bias Low concern applicability	High risk bias	Unclear sampling method Unclear exclusions Unclear blinding Not all subjects included in analysis	II
Berlit 2012	Unclear risk bias Low concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear sampling Unclear blinding Unclear time interval	II

Appendix A: Quality Ratings of Included Articles

Bundred 2015 BIS (CM)	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	High risk bias	Unclear sampling method Unclear exclusions Unclear blinding Not all subjects included in analysis	II
Fu 2013	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Low risk bias	Purposive sampling method Unclear blinding	II
Halaska 2006	High risk bias Unclear concern applicability	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Case-control study Threshold not pre-specified Some blinding unclear Unclear time interval	III
Circumferential Measure - Diagnostic Accuracy						
Smoot 2011 (prior dx)	Low risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Low risk bias	Some blinding unclear Reference standard poorly defined	II
Hayes 2008	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear exclusions Unclear blinding Unclear time interval	II

Appendix A: Quality Ratings of Included Articles

Hayes 2005	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	Unclear exclusions Unclear blinding Unclear time interval	II
Bland 2003	High risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Exclusion criteria Some blinding unclear Unclear time interval	II
Godoy 2007	Unclear risk bias Unclear concern applicability	Unclear risk bias High concern applicability	Unclear risk bias High concern applicability	Unclear risk bias	Unclear methodology No demographics or treatment information given	II
Asim 2012	High risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias Low concern applicability	High risk bias	Case-control study Blinding Not all patients included in analysis	III
Water Displacement - Diagnostic Accuracy						
Godoy, 2007	Unclear risk bias Unclear concern applicability	Unclear risk bias High concern applicability	Unclear risk bias High concern applicability	Unclear risk bias	Unclear methodology No demographics or treatment information given	II
MRI: Diagnostic Accuracy						
Mihara 2012	High risk bias	Unclear risk bias	Unclear risk bias	Unclear risk bias	Subject all with Dx, other arm control	III

Appendix A: Quality Ratings of Included Articles

	Low concern applicability	Low concern applicability	Unclear concern applicability		Some blinding unclear Time interval unclear	
CT: Diagnostic Accuracy						
Mihara 2012	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Subject all with Dx, other arm control Some blinding unclear Time interval unclear	III
Lymphoscintigraphy: Diagnostic Accuracy						
Mihara 2012	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Subject all with Dx, other arm control Some blinding unclear Time interval unclear	III
Lymphography: Diagnostic Accuracy						
Akita 2013	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias	All subjects under consideration for surgery Some blinding unclear Time interval unclear	II
Mihara 2012	High risk bias Low concern applicability	Unclear risk bias Low concern applicability	Unclear risk bias Unclear concern applicability	Unclear risk bias	Subject all with Dx, other arm control Some blinding unclear	III

					Time interval unclear	
Ultrasound: Diagnostic Accuracy						
DeVoodgt 2014	Unclear risk bias Low concern applicability	Low risk bias Low concern applicability	Low risk bias Low concern applicability	High risk bias	Unclear sampling All subjects not included in analysis	I

References

Adriaenssens N, Belsack D, Buyl R, et al. Ultrasound elastography as an objective diagnostic measurement tool for lymphoedema of the treated breast in breast cancer patients following breast conserving surgery and radiotherapy. *Radiol Oncol.* 2012;46:284–295.

Adriaenssens N, Buyl R, Lievens P, et al. Comparative study between mobile infrared optoelectronic volumetry with a Perometer and two commonly used methods for the evaluation of arm volume in patients with breast cancer related lymphedema of the arm. *Lymphology.* 2013;46:132–143.

Akita S, Mitsukawa N, Kazama T, et al. Comparison of lymphoscintigraphy and indocyanine green lymphography for the diagnosis of extremity lymphoedema. *J Plast Reconstr Aesthet Surg.* 2013;66:792–798.

Ancukiewicz M, Miller CL, Skolny MN, et al. Comparison of relative versus absolute arm size change as criteria for quantifying breast cancer-related lymphedema: the flaws in current studies and need for universal methodology [erratum in: *Breast Cancer Res Treat*. 2012;136:623]. *Breast Cancer Res Treat.* 2012;135:145–152.

Ancukiewicz M, Russell TA, Otoole J, et al. Standardized method for quantification of developing lymphedema in patients treated for breast cancer. *Int J Radiat Oncol Biol Phys.* 2011;79:1436–1443.

Armer JM, Radina ME, Porock D, Culbertson SD. Predicting breast cancer-related lymphedema using self-reported symptoms. *Nurs Res.* 2003;52:370–379.

Asim M, Cham A, Banerjee S, et al. Difficulties with defining lymphoedema after axillary dissection for breast cancer. *N Z Med J*. 2012;125:29–39.

Bagheri S, Ohlin K, Olsson G, Brorson H. Tissue tonometry before and after liposuction of arm lymphedema following breast cancer. *Lymphat Res Biol.* 2005;3:66–80.

Balzarini A, Milella M, Civelli E, et al. Ultrasonography of arm edema after axillary dissection for breast cancer: a preliminary study. *Lymphology*. 2001;34:152–155.

Berlit S, Brade J, Tuschy B, et al. Comparing bioelectrical impedance values in assessing early upper limb lymphedema after breast cancer surgery. *In Vivo.* 2012;26:863–867.

Berlit S, Brade J, Tuschy B, et al. Whole-body bioelectrical impedance analysis in assessing upper-limb lymphedema after breast cancer therapy. *Anticancer Res.* 2013;33:4553–4556.

Bland KL, Perczyk R, Du W, et al. Can a practicing surgeon detect early lymphedema reliably? *Am J Surg.* 2003;186:509–513.

Blaney JM, McCollum G, Lorimer J, et al. Prospective surveillance of breast cancer-related lymphoedema in the first-year post-surgery: feasibility and comparison of screening measures. *Supp Care Cancer.* 2015;23:1549–1559.

Borthwick Y, Paul L, Sneddon M, et al. Reliability and validity of the figure-of-eight method of measuring hand size in patients with breast cancer-related lymphoedema. *Eur J Cancer Care (Engl).* 2013;22:196–201.

Brorson H, Hoijer P. Standardised measurements used to order compression garments can be used to calculate arm volumes to evaluate lymphoedema treatment. *J Plast Surg Hand Surg.* 2012;46:410–415.

Brorson H, Ohlin K, Olsson G, Karlsson MK. Breast cancer-related chronic arm lymphedema is associated with excess adipose and muscle tissue. *Lymphat Res Biol.* 2009;7:3–10.

Brorson H, Ohlin K, Olsson G, Nilsson M. Adipose tissue dominates chronic arm lymphedema following breast cancer: an analysis using volume rendered CT images. *Lymphat Res Biol*. 2006;4:199–210.

Bulley C, Gaal S, Coutts F, et al. Comparison of breast cancer-related lymphedema (upper limb swelling) prevalence estimated using objective and subjective criteria and relationship with quality of life. *Biomed Res Int.* 2013;2013:807569.

Bulley C, Coutts F, Blyth C, et al. A morbidity screening tool for identifying fatigue, pain, upper limb dysfunction and lymphedema after breast cancer treatment: a validity study. *Eur J Oncol Nurs.* 2014;18:218–227

Bundred NJ, Stockton C, Keeley V, et al. Comparison of multi-frequency bioimpedance with perometry for the early detection and

intervention of lymphoedema after axillary node clearance for breast cancer. *Breast Cancer Res Treat.* 2015;151:121–129.

Chen YW, Tsai HJ, Hung HC, Tsauo JY. Reliability study of measurements for lymphedema in breast cancer patients. *Am J Phys Med Rehabil.* 2008;87:33–38.

Choi YH, Seo KS. Correlation among bioimpedance analysis, sonographic and circumferential measurement in assessment of breast cancer-related arm lymphedema. *Lymphology*. 2014;47:123–133.

Cornish BH, Chapman M, Hirst C, et al. Early diagnosis of lymphedema using multiple frequency bioimpedance. *Lymphology.* 2001;34:2–11.

Czerniec SA, Ward LC, Lee MJ, et al. Segmental measurement of breast cancer-related arm lymphoedema using perometry and bioimpedance spectroscopy. *Support Care Cancer.* 2011;19:703–710.

Czerniec SA, Ward LC, Refshauge KM, et al. Assessment of breast cancer-related arm lymphedema: comparison of physical measurement methods and self-report. *Cancer Invest.* 2010;28:54–62.

Damstra RJ, Glazenburg EJ, Hop WC. Validation of the inverse water volumetry method: a new gold standard for arm volume measurements. *Breast Cancer Res Treat.* 2006;99:267–273.

Deltombe T, Jamart J, Recloux S, et al. Reliability and limits of agreement of circumferential, water displacement, and optoelectronic volumetry in the measurement of upper limb lymphedema. *Lymphology.* 2007;40:26–34.

Deng J, Ridner SH, Wells N, et al. Development and preliminary testing of head and neck cancer related external lymphedema and fibrosis assessment criteria. *Eur J Oncol Nurs.* 2015;19:75–80.

Devoogdt N, Lemkens H, Geraerts I, et al. A new device to measure upper limb circumferences: validity and reliability. *Int Angiol.* 2010;29:401–407.

Devoogdt N, Pans S, De Groef A, et al. Postoperative evolution of thickness and echogenicity of cutis and subcutis of patients with and without breast cancer-related lymphedema. *Lymphatic Res Biol.* 2014;12:23–31.

Donahue MJ, Donahue PC, Rane S, et al. Assessment of lymphatic impairment and interstitial protein accumulation in patients with breast cancer treatment-related lymphedema using CEST MRI. *Magn Reson Med*. 2016;75:345–355.

Dylke ES, Alsobayel H, Ward LC, et al. Use of impedance ratios to assess hand swelling in lymphoedema. *Phlebology.* 2014;29:83–89.

Dylke ES, McEntee MF, Schembri GP, et al. Reliability of a radiological grading system for dermal backflow in lymphoscintigraphy imaging. *Acad Radiol.* 2013;20:758–763.

Dylke ES, Yee J, Ward LC, et al. Normative volume difference between the dominant and nondominant upper limbs in healthy older women. *Lymphat Res Biol.* 2012;10:182–188.

Erends M, van der Aa T, de Grzymala AP, van der Hulst R. Validity and reliability of three-dimensional imaging for measuring the volume of the arm. *Lymphatic Res Biol.* 2014;12:275–281.

Foroughi N, Dylke ES, Paterson RD, et al. Inter-rater reliability of arm circumference measurement. *Lymphat Res Biol.* 2011;9:101–107.

Fu MR, Cleland CM, Guth AA, et al. L-dex ratio in detecting and diagnosing breast cancer-related lymphedema: reliability, sensitivity, and specificity. *Lymphology*. 2013;46:85–96.

Galiano-Castillo N, Ariza-Garcia A, Cantarero-Villanueva I, et al. Agreement between telerehabilitation involving caregivers and face-to-face clinical assessment of lymphedema in breast cancer survivors. *Support Care Cancer.* 2014;22:253–258.

Galland C, Auvert JF, Flahault A, Vayssairat M. Why and how post-mastectomy edema should be quantified in patients with breast cancer. *Breast Cancer Res Treat.* 2002;75:87–89.

Gjorup C, Zerahn B, Hendel HW. Assessment of volume measurement of breast cancer-related lymphedema by three methods: circumference measurement, water displacement, and dual energy X-ray absorptiometry. *Lymphat Res Biol.* 2010;8:111–119.

Godoy JM, Silva SH, Godoy MF. Sensitivity and specificity of combined perimetric and volumetric evaluations in the diagnosis of arm lymphedema. *Prague Med Rep.* 2007;108:243–247.

Halaška MJ, Komárek V, Malá I, et al. A method for the detection of post-operative lymphoedema after operation for breast cancer: multifrequency bioelectrical impedance analysis. *J Appl Biomed.* 2006;4:179–185.

Hayes S, Cornish B, Newman B. Comparison of methods to diagnose lymphoedema among breast cancer survivors: 6-month follow-up. *Breast Cancer Res Treat.* 2005;89:221–226.

Hayes S, Janda M, Cornish B, et al. Lymphedema secondary to breast cancer: how choice of measure influences diagnosis, prevalence, and identifiable risk factors. *Lymphology.* 2008;41:18–28.

Hwang JH, Lee CH, Lee HH, Kim SY. A new soft tissue volume measurement strategy using ultrasonography. *Lymphatic Res Biol.* 2014;12:89–94.

Jain MS, Danoff JV, Paul SM. Correlation between bioelectrical spectroscopy and perometry in assessment of upper extremity swelling. *Lymphology.* 2010;43:85–94.

Karges JR, Mark BE, Stikeleather SJ, Worrell TW. Concurrent validity of upper-extremity volume estimates: comparison of calculated volume derived from girth measurements and water displacement volume. *Phys Ther.* 2003;83:134–145.

Katz-Leurer M, Bracha J. Test-retest reliability of arm volume measurement in women with breast cancer-related lymphedema. *J Lymphoedema.* 2012;7:8–13.

Kim L, Jeon JY, Sung IY, et al. Prediction of treatment outcome with bioimpedance measurements in breast cancer related lymphedema patients. *Ann Rehabil Med.* 2011;35:687–693.

Kim W, Chung SG, Kim TW, Seo KS. Measurement of soft tissue compliance with pressure using ultrasonography. *Lymphology.* 2008;41:167–177.

Lee BB, Bergan JJ. New clinical and laboratory staging systems to improve management of chronic lymphedema. *Lymphology.* 2005;38:122–129.

Lee MJ, Boland RA, Czerniec S, Kilbreath SL. Reliability and concurrent validity of the perometer for measuring hand volume in women with and without lymphedema. *Lymphat Res Biol.* 2011;9:13–18.

Lette J. A simple and innovative device to measure arm volume at home for patients with lymphedema after breast cancer. *J Clin Oncol.* 2006;24:5434–5440.

Lu G, DeSouza GN, Armer J, et al. A system for limb-volume measurement using 3D models from an infrared depth sensor. *Proc 2013 IEEE Symp Comput Intelligence Healthc E-Health (Cicare)*. 2013:64–69.

Lu G, Han K, Desouza GN, et al. A new algorithm for 3D registration and its application in self-monitoring and early detection of lymphedema. *IRBM*. 2014;35:370–384.

Mayrovitz HN. Assessing local tissue edema in postmastectomy lymphedema. *Lymphology.* 2007;40:87–94.

Mayrovitz HN. Assessing lymphedema by tissue indentation force and local tissue water. *Lymphology.* 2009;42:88–98.

Mayrovitz HN, Davey S, Shapiro E. Local tissue water assessed by tissue dielectric constant: anatomical site and depth dependence in women prior to breast cancer treatment-related surgery. *Clin Physiol Funct Imaging.* 2008;28:337–342.

Mayrovitz HN, Weingrad DN, Lopez L. Patterns of temporal changes in tissue dielectric constant as indices of localized skin water changes in women treated for breast cancer: a pilot study. *Lymphatic Res Biol.* 2015;13:20–32.

Mayrovitz HN, Weingrad DN, Lopez L. Assessing localized skin-to-fat water in arms of women with breast cancer via tissue dielectric constant measurements in pre- and post-surgery patients. *Ann Surg Oncol*. 2015;22:1483–1489.

Mayrovitz HN, Weingrad DN, Davey S. Local tissue water in at-risk and contralateral forearms of women with and without breast cancer treatment-related lymphedema. *Lymphat Res Biol.* 2009;7:153–158.

McKinnon JG, Wong V, Temple WJ, et al. Measurement of limb volume: laser scanning versus volume displacement. *J Surg Oncol.* 2007;96:381–388.

Megens AM, Harris SR, Kim-Sing C, McKenzie DC. Measurement of upper extremity volume in women after axillary dissection for breast cancer. *Arch Phys Med Rehabil.* 2001;82:1639–1644.

Meijer RS, Rietman JS, Geertzen JH, et al. Validity and intra- and interobserver reliability of an indirect volume measurements in patients with upper extremity lymphedema. *Lymphology.* 2004;37:127–133.

Mellor RH, Bush NL, Stanton AW, et al. Dual-frequency ultrasound examination of skin and subcutis thickness in breast cancer-related lymphedema. *Breast J.* 2004;10:496–503.

Mihara M, Murai N, Hayashi Y, et al. Using indocyanine green fluorescent lymphography and lymphatic-venous anastomosis for cancer-related lymphedema. *Ann Vasc Surg.* 2012;26:278.e1–6.

Mirnajafi A, Moseley A, Piller N. A new technique for measuring skin changes of patients with chronic postmastectomy lymphedema. *Lymphat Res Biol.* 2004;2:82–85.

Mori T, Lustman A, Katz-Leurer M. Self-measurement of upper extremity volume in women post-breast cancer: reliability and validity study. *Physiother Theory Pract.* 2015;31:283–287.

Moseley A, Piller N. Reliability of bioimpedance spectroscopy and tonometry after breast conserving cancer treatment. *Lymphat Res Biol.* 2008;6:85–87.

Newman AL, Rosenthall L, Towers A, et al. Determining the precision of dual energy x-ray absorptiometry and bioelectric impedance spectroscopy in the assessment of breast cancer-related lymphedema. *Lymphat Res Biol.* 2013;11:104–109.

Norman SA, Miller LT, Erikson HB, et al. Development and validation of a telephone questionnaire to characterize lymphedema in women treated for breast cancer. *Phys Ther.* 2001;81:1192–1205.

Ohberg F, Zachrisson A, Holmner-Rocklov A. Three-dimensional camera system for measuring arm volume in women with lymphedema following breast cancer treatment. *Lymphatic Res Biol*. 2014;12:267–274.

O'Toole J, Jammallo LS, Skolny MN, et al. Lymphedema following treatment for breast cancer: a new approach to an old problem. *Crit Rev Oncol Hematol*. 2013;88:437–446.

Purcell A, Nixon J, Fleming J, et al. Measuring head and neck lymphoedema: the "ALOHA" trial. *Head Neck.* 2016;38:79–84.

Ridner SH, Dietrich MS. Development and validation of the Lymphedema Symptom and Intensity Survey-Arm. *Support Care Cancer*. 2015;23:3103–3112.

Ridner SH, Montgomery LD, Hepworth JT, et al. Comparison of upper limb volume measurement techniques and arm symptoms between healthy volunteers and individuals with known lymphedema. *Lymphology.* 2007;40:35–46.

Sagen A, Kåresen R, Risberg MA. The reliability of a simplified water displacement instrument: a method for measuring arm volume. *Arch Phys Med Rehabil.* 2005;86:86–89.

Sagen A, Karesen R, Skaane P, Risberg MA. Validity for the simplified water displacement instrument to measure arm lymphedema as a result of breast cancer surgery. *Arch Phys Med Rehabil.* 2009;90:803–809.

Sander AP, Hajer NM, Hemenway K, Miller AC. Upper-extremity volume measurements in women with lymphedema: a comparison of measurements obtained via water displacement with geometrically determined volume. *Phys Ther.* 2002;82:1201–1212.

Sakuda H, Satoh M, Sakaguchi M, et al. Physiological characteristics of the body fluid in lymphedematous patients postbreast cancer surgery, focusing on the intracellular/extracellular fluid ratio of the upper limb. *Jpn J Nurs Sci.* 2010;7:108–118.

Santin L, Ward LC. Agreement between dual energy X-ray absorptiometry and opto-electronic volumetry for measurement of forearm volume. *Lymphat Res Biol.* 2014;12:164–168.

Shah C, Vicini F, Beitsch P, et al. The use of bioimpedance spectroscopy to monitor therapeutic intervention in patients treated for breast cancer related lymphedema. *Lymphology*. 2013;46:184–192.

Smoot BJ, Wong JF, Dodd MJ. Comparison of diagnostic accuracy of clinical measures of breast cancer-related lymphedema: area under the curve. *Arch Phys Med Rehabil.* 2011;92:603–610.

Stout NL, Pfalzer LA, Levy E, et al. Segmental limb volume change as a predictor of the onset of lymphedema in women with early breast cancer. *PM R.* 2011;3:1098–1105.

Svensson BJ, Dylke ES, Ward LC, Kilbreath SL. Segmental impedance thresholds for early detection of unilateral upper limb swelling. *Lymphat Res Biol.* 2015;13:253–259.

Tassenoy A, De Mey J, De Ridder F, et al. Postmastectomy lymphoedema: different patterns of fluid distribution visualised by ultrasound imaging compared with magnetic resonance imaging. *Physiotherapy.* 2011;97:234–243.

Taylor R, Jayasinghe UW, Koelmeyer L, et al. Reliability and validity of arm volume measurements for assessment of lymphedema. *Phys Ther.* 2006;86:205–214.

Tewari N, Gill PG, Bochner MA, Kollias J. Comparison of volume displacement versus circumferential arm measurements for lymphoedema: implications for the SNAC trial. *ANZ J Surg.* 2008;78:889–893.

Tsang KK, Norte GE, Hand JW. The assessment of hand volume using a modified volumetric technique. *J Test Eval.* 2012;40:329–333.

Ward LC, Czerniec S, Kilbreath SL. Operational equivalence of bioimpedance indices and perometry for the assessment of unilateral arm lymphedema. *Lymphat Res Biol.* 2009;7:81–85.

Yamamoto T, Yamamoto N, Hara H, et al. Upper extremity lymphedema index: a simple method for severity evaluation of upper extremity lymphedema. *Ann Plast Surg.* 2013;70:47–49.

Yamamoto N, Yamamoto T, Hayashi N, et al. Arm volumetry versus upper extremity lymphedema index: validity of upper extremity lymphedema index for body-type corrected arm volume evaluation. *Ann Plast Surg*. 2016;76:697–699.

York SL, Ward LC, Czerniec S, et al. Single frequency versus bioimpedance spectroscopy for the assessment of lymphedema. *Breast Cancer Res Treat.* 2009;117:177–182.