## **Contents**

## Part I Patch Testing

1	Path	ophysio	ology of Allergic and Irritant Contact Dermatitis	3	
	1.1	.1 Introduction			
	1.2	Pathop	hysiology of Irritant and Allergic Skin Inflammation	3	
		1.2.1	Irritant and/or Allergic Chemicals	4	
		1.2.2	Skin Irritation: Activation of		
			Innate Immunity	5	
	1.3	Skin A	llergy: The Role of Specific Immunity	6	
		1.3.1	Antigen-Specific Immunity	6	
		1.3.2	Skin Allergy: Mechanisms of Action	6	
		1.3.3	Indirect Responsibility of Chemicals		
			in Skin Irritation	7	
	1.4	Pathop	physiology of Skin Inflammation: The Connection		
		Betwee	en Innate and Acquired Immunity	7	
	Refe	erences.		8	
2	Dise	ases for	Which Patch Testing Is Recommended:		
	Pati		Charl D. Tarrattina A. J		
	1 4442	ents Wh	no Should Be Investigated		
	2.1		ic Contact Dermatitis	11	
				11 11	
		Allerg	ic Contact Dermatitis	1 1 1 1	
		Allerge 2.1.1 2.1.2	ic Contact Dermatitis	11	
	2.1	Allerge 2.1.1 2.1.2	ic Contact Dermatitis	1 1 1 1	
	2.1	Allerge 2.1.1 2.1.2 Allerg	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.	11 11 14	
	2.1	Allerg. 2.1.1 2.1.2 Allerg 2.2.1	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.  Stage 1 of ACDS.	11 11 14 14	
	2.1	Allerg 2.1.1 2.1.2 Allerg 2.2.1 2.2.2 2.2.3	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.  Stage 1 of ACDS.  Stage 2 of ACDS.	11 11 14 14	
	2.1	Allerg 2.1.1 2.1.2 Allerg 2.2.1 2.2.2 2.2.3 Allerg	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.  Stage 1 of ACDS.  Stage 2 of ACDS.  Stage 3 of ACDS.	11 11 14 14	
	2.1	Allerg 2.1.1 2.1.2 Allerg 2.2.1 2.2.2 2.2.3 Allerg Derma	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.  Stage 1 of ACDS.  Stage 2 of ACDS.  Stage 3 of ACDS.  ic Contact Dermatitis Versus Irritant Contact	11 11 14 14 17	
	<ul><li>2.1</li><li>2.2</li><li>2.3</li></ul>	Allerge 2.1.1 2.1.2 Allerg 2.2.1 2.2.2 2.2.3 Allerg Derma Other	ic Contact Dermatitis.  Clinical Signs and Symptoms.  Histopathological Features.  ic Contact Dermatitis Syndrome.  Stage 1 of ACDS.  Stage 2 of ACDS.  Stage 3 of ACDS.  ic Contact Dermatitis Versus Irritant Contact atitis: Criteria for Differential Diagnosis.	11 11 14 14 17	

	2.6		Dermatitis: Definition and Procedures	05
			ed in Differential Diagnosis	25
		2.6.1	Hand Dermatitis: Exogenous and Endogenous Factors	26
		2.6.2	A Classification of Hand Dermatitis	26
		2.6.3	Tools of Investigation	31
		2.6.4	Hand Dermatitis: Some Examples	
			of an Algorithmic Approach	31
		2.6.5	Hand Eczema: A Controversial Issue	31
	Refe	rences.		32
3			ng Methodology	35
	3.1		ical Background	35
	3.2		tion and Aims	36
		3.2.1	Requirements for an Ideal Patch	
			Testing Procedure	36
		3.2.2	Is Patch Testing the "Gold Standard"	
			to Investigate Patients with Allergic	
			Contact Dermatitis?	37
	3.3		Test Units	37
		3.3.1	Nonchamber Patch Tests	37
		3.3.2	Chamber Patch Tests	37
		3.3.3	Plastic Square Chambers	41
		3.3.4	Reinforcement of Patch Test Units	45
	3.4		neral Overview of Allergens	45
		3.4.1	Allergens	45
		3.4.2	Bioavailability of Allergens	47
		3.4.3	Quality Control of Allergens	47
		3.4.4	Appropriate Amounts of Petrolatum	
			to Be Applied at Patch Testing	47
		3.4.5	Appropriate Amounts of Liquids	
			to Be Applied at Patch Testing	48
	3.5		fic Recommendations When Considering	
			Testing Patients	48
		3.5.1	Patch Testing on Intact Skin Is Critical	48
		3.5.2	Medicaments and Patch Testing	49
		3.5.3	Pregnancy and Patch Testing	50
		3.5.4	Patch Testing in Children	50
	3.6		cation of Patch Tests on the Skin:	
			Practical Suggestions	51
		3.6.1	Test Sites	51
		3.6.2	Removal of Hair	52
		3.6.3	Degreasing of Test Site	52
		3.6.4	Application of Test Strips	52
		365	Instructions to Patients	52

Contents xiii

3.7	Readin	g Time	52
	3.7.1	Standard Patch Test Occlusion	
		and Reading Time	53
	3.7.2	Conventional Patch Test Reading Time	53
	3.7.3	Reading at Day 2, Day 3, and Day 4	53
	3.7.4	Reading at Day 7	53
	3.7.5	Single Reading Versus Multiple Reading	54
	3.7.6	Day 3 Versus Day 4 Reading	54
	3.7.7	One-Day Occlusion Versus Two-Day Occlusion	54
	3.7.8	Marking the Skin	54
	3.7.9	Positive Control	55
	3.7.10	Immediate Urticarial Reactions to Some Allergens	55
3.8	Readin	g and Scoring Patch Test Results	56
	3.8.1	Scoring Codes According to the ICDRG	56
	3.8.2	Proposal for Modified Scoring Codes	
		of Positive Patch Test Reactions,	
		According to ESCD and EECDRG	57
	3.8.3	Rating Patch Test Reactions Based	
		on Digital Images	57
	3.8.4	Bioengineering Methods for Evaluating	
		Skin Irritation and Allergic Reactions.	
		A Comparison with Visual Scoring	57
	3.8.5	Remarks About Reading and Scoring	
		Patch Test Results	58
3.9	Irritant	Patch Test Reactions	60
3.10	False-I	Positive Patch Test Reactions	63
3.11	False-N	Negative Patch Test Reactions	63
3.12	Compo	ound Allergy	65
3.13	Cross-	Sensitization, Concomitant Sensitization,	
		lysensitization	65
		Cross-Sensitization	65
		Concomitant Sensitization	66
		Polysensitization	66
3.14		nted Adverse Reactions of Patch Testing	66
		Patch Test Sensitization ("Active Sensitization")	68
		Excited Skin Syndrome ("Angry Back")	68
		Test Readings in Different Ethnic Populations	69
		Patch Test Reading in Oriental Populations	69
		Patch Test Reading in Black Populations	70
3.16		Testing Techniques in Different	
		tic Environments	7
	3.16.1	Temperate Climates	72
	3.16.2	Tropical Climates	72
	3.16.3	Patch Testing Procedures in the Tropics	72

	3.17	Is Self-assessment of Allergic Contact			
		Dermatitis by Patients Recommendable?	73		
		3.17.1 Self-assessment by Questionnaires	73		
		3.17.2 Self-readings of Patch Tests by Patients	73		
	Refe	rences	74		
4	Raco	line Series of Patch Tests	79		
7	4.1	Historical Background.	79		
	4.1	Advantages and Disadvantages	19		
	4.2		79		
		of Using a Baseline Series of Patch Tests	79		
		<i>5</i>	80		
	4.2	C C	80		
	4.3	Three Major Baseline Series Used Worldwide			
	4.4	"Mixes" of Baseline Series	83		
	4.5	ICDRG-Revised International Minimal	0.2		
		Baseline Series of Patch Tests	83		
	4.6	Concise Information About Allergens Included in the	0.6		
		Updated 2011 Minimal Baseline Series of the ICDRG	86		
	4.7	Concise Information on Other Common			
		Allergens Included in the Updated 2011			
		Minimal Baseline Series of the ICDRG	90		
	4.8	Additional Series of Patch Tests	91		
	Refe	rences	91		
5	Phot	copatch Testing	95		
	5.1	Definition and Aims	95		
	5.2	Photoallergic Contact Dermatitis	95		
	5.3	Photoallergic Contact Dermatitis			
	0.0	Versus Airborne Allergic Contact Dermatitis:			
		Criteria for Differential Diagnosis	97		
	5.4	Photoallergic Drug Eruptions	98		
	5.5	Photopatch Testing Methodology	98		
	5.6	Light Sources.	99		
	5.7	Proposal for a Photopatch Test Series	100		
		rences	100		
6		JE Test System	103		
	6.1	Introduction	103		
	6.2	TRUE Test System	103		
	6.3	More Practical Information			
		About the Technology of TRUE Test	104		
	6.4	Regulatory Information	106		
	6.5	Standard TRUE Test Series	106		
	6.6	New Additions	109		
	6.7	Methodology of Use	109		
	0.7	Wichiodology of Osc	100		
	6.8	Additional Practical Information.	110		

χV

7	Addi	tional Testing Procedures and Spot Tests	113			
	7.1		113			
	7.2		113			
	7.3		114			
	7.4		116			
	7.5		117			
			118			
		7.5.2 Steps Required Prior to Any				
			119			
		7.5.3 Testing Procedures with Solid				
			119			
		7.5.4 Testing Procedures with Cosmetics				
			121			
	7.6	Oral Provocation Test (Oral Challenge)	121			
	7.7	Other Investigations	122			
			122			
			122			
		7.7.3 Chemical Analysis	126			
	7.8	Additional Remarks About Chemistry and Immunology				
			127			
	Refe		127			
8	_	ical relevance of a well and a second a second and a second a second and a second a second and a second and a second and a second a second a second	129 129			
	8.1	ind oddetion	129			
	8.2	General Timespies Title 1	130			
	8.3	Tast and Current Relevance.	130			
	8.4	Scoring System	131			
	8.5	Strategies	131			
		8.5.1 Clinical History	132			
			134			
		8.5.3 Further Correlations	134			
	0.6	8.5.4 Additional Investigations	134			
	8.6	Suggestions for Improved Evidence-Based	135			
	0.7	Diagnosis of Relevance	135			
	8.7	Additional Remark				
	Refe	erences	136			
9	Ato	py Patch Tests	137			
	9.1	Introduction	137			
	9.2	Summary of the Pathophysiology of Atopic Dermatitis	137			
		9.2.1 Influence of Age	138			
	9.3	Principles and Usage of Atopy Patch Tests	138			
	9.4	Technical Aspects of Atopy Patch Tests	138			
		9.4.1 Materials: Allergens, Vehicles and Controls	138			
		9.4.2 Prior Precautions	140			
		9.4.3 Procedure and Reading of Atopy Patch Tests	140			

xvi Contents

	9.5	Side Effects	141
	9.6	Interpretation of Results	141
		9.6.1 Sensitivity, Specificity and Reproducibility	
		of Atopy Patch Tests	141
		9.6.2 Clinical Relevance of Atopy Patch Tests	142
	9.7	Conclusion.	142
	Refer	rences	143
Par		Prick Testing	
10		trum of Diseases for Which Prick Testing	
	_	Open (Non-prick) Testing Are Recommended:	
		ents Who Should Be Investigated	147
		Contact Urticaria Syndrome	147
		10.1.1 Clinical Symptoms and Stages of CUS	147
		10.1.2 Etiology and Mechanisms of CUS	149
		10.1.3 Contact Urticaria to Natural Rubber Latex	152
	10.2	Protein Contact Dermatitis	153
		rences	156
11		nodology of Open (Non-prick) Testing, Prick Testing,	
		Its Variants	159
		Open (Non-prick) Testing	159
	11.2	Prick Test: Technical Modalities and Reading	160
		11.2.1 Technique of Puncture	160
		11.2.2 Control Solutions	160
		11.2.3 Reading Time	161
		11.2.4 Reading Prick Test Results	162
		11.2.5 Medicaments and Prick Testing	162
		11.2.6 False-Negative Reactions	163
		11.2.7 False-Positive Reactions	163
		11.2.8 Prick Tests in Children and Babies	163
	11.3	Prick-by-Prick Test	163
	11.4	Scratch Test	163
	11.5	Scratch-Chamber Test	164
	11.6	Comparative Indications of Open (Non-prick)	
		Testing, Prick Testing, and Other Related Tests	164
	11.7	Intradermal Testing for Type 1 Hypersensitivity	164
	11.8	Prick Testing: Allergens of Interest for Skin Problems	165
		11.8.1 Latex	165
		11.8.2 Airborne Environmental per Annum Allergens	166
		11.8.3 Airborne Environmental Seasonal Allergens	166
		11.8.4 Food Allergens (Trophallergens)	166
		11.8.5 Occupational Allergens	167

Contents xvii

			Fungi	168
		11.0.7	Non-immunological) Urticariogens	168
	Refe	rences		169
Part	III	-	g in Cutaneous Systemic Immune-Related se Drug Reactions: Interest and Limitations	
12			edures in Cutaneous Systemic	4.50
			lated Adverse Drug Reactions	173
	12.1		al Considerations	173
			al of a Classification of CADR	175
			of Investigation in CADR	175
			athological Limitations in Diagnosis of a CADR	176
	12.5		Testing in CADR	177
		12.5.1	Spectrum of CADRs for Which Patch	
			Testing Is Recommended	177
		12.5.2	Spectrum of CADRs for Which Patch Testing	
			Can Be Performed (Being Still Controversial)	178
		12.5.3	Spectrum of CADRs for Which Patch Testing	
			Is of No Interest	179
		12.5.4	Guidelines in Drug Patch Testing: General Rules	179
			Technical Aspects of Drug Patch Testing	180
		12.5.6	Readings of Drug Patch Tests	183
		12.5.7	False-Negative Patch Test Reactions	183
		12.5.8	False-Positive Patch Test Reactions	183
	12.6	Prick 7	Testing in CADR	183
	12.7	Intrade	ermal Testing in CADR	184
	12.8	Oral P	rovocation Test (Oral Challenge) in CADR	184
	Refe	rences.		184
App	endic	es		187
	App	endix A:	: Additional Series of Patch Tests	187
		A.1	Introductory Remarks	187
		A.2	Bakery Series	188
		A.3	Corticosteroid Series	188
		A.4	Cosmetic Series	191
	`	A.5	Epoxy Resin Series	193
		A.6	Hairdressing Series	193
		A.7	Isocyanate Series	194
		A.8	Metal Series	196
		A.9	(Meth)Acrylates Series	196
		A.10	Plastics and Glues Series	198
		A.11	Rubber Additives Series	199

xviii Contents

A.12 Textile Dyes and Finish Series	200
A.13 Other Series	202
References	206
Appendix B: The International Contact Dermatitis Research Group	207
B.1 Historical Background	207
B.2 Current Tasks and Strategy of the ICDRG	208
B.3 ICDRG Members	208
References	210
Appendix C: A List of Companies Producing and/or Distributing	
Patch and/or Prick Test Materials and/or Allergens	210
C.1 , Introductory Remarks	210
C.2 List of Companies	210
Suggested Reading	213
ndev	215